FEBRUARY, 1952 Vol. 41, No. 2

PHILOSOPHY, RELIGION AND EDUCATION

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

PUBLIC LIBRARY JAN 22 1952 DETROIT

The Shop Teachers' Professional Magazine

Tomorrow's skilled shopmen must know how COLOR DYNAMICS improves production techniques

MANY educators in industrial and vocational schools now include Pittsburgh COLOR DYNAMICS in their training of skilled shopmen. They recognize that this knowledge will be of great help to students in their future tasks.

● **Executives in industry** are becoming increasingly aware of the importance of physical and psychological factors upon workers and their output. They recognize that some colors stimulate, others are restful, still others depress—even cause irritation and discomfort.

● **Pittsburgh's** system of COLOR DYNAMICS makes use of this *energy in color* scientifically and systematically to improve production and enhance the welfare of workers.

● **By the proper** application of COLOR DYNAMICS on machines, the operator's attention is focused better on his task. By the use of *focal* colors, working parts are separated from stationary parts and the material being fabricated. This reduces eye travel which is one of the causes of eye-fatigue and lessened efficiency.

● **Use of *eye-rest* colors** on walls and ceilings further relaxes the eyes of workers. *Morale-building* colors promote cheerfulness and cause a worker to show greater interest in his task. *Safety* colors reduce accident hazards.

● **In hundreds of plants** where COLOR DYNAMICS has been applied, more work per man-hour and more man-hours per man have resulted. Absenteeism has been reduced. Relations between management and workers have been bettered.

● **These are factors** in industry with which the skilled shopman of tomorrow must be familiar. If you wish your students to be better equipped for the future, begin now to teach them COLOR DYNAMICS.

● **Write today** for a free copy of our booklet which contains a full explanation of COLOR DYNAMICS and how to use it. Better still, demonstrate its principles in a practical manner by painting one or two machines in your classrooms.

We'll Make a Free Color Engineering Study of Your Classrooms

● Should you desire a COLOR DYNAMICS analysis of your manual training rooms—we'll be glad to make one *free* and without obligation. There's a color engineering expert at each of our offices in principal cities. A call will bring him to your school at your convenience. Or mail this coupon.

SEND FOR FREE COPY OF THIS BOOK!

Pittsburgh Plate Glass Co., Paint Div., Department IA-22, Pittsburgh 22, Pa.

☐ Please send me a FREE copy of your new revised and enlarged booklet, "Color Dynamics In Industry."

☐ Please have your representative call for a Color Dynamics Survey of our properties without obligation on our part.

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PITTSBURGH PLATE GLASS COMPANY

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FOR 10 YEARS

Performance is the proof of dependability, and this enthusiastic letter from Mr. Frank Huffaker, director of Kirkman Vocational High School, Chattanooga, Tennessee, cites a typical example of the long, trouble-free service you can expect from South Bend Lathes. In another letter, Mr. Huffaker told us that from 1941 to 1945 these 13" swing South Bend Lathes were used approximately 24 hours a day for adult defense training. Since then they have been used by high school students for six hours a day 12 months a year, plus six hours a week for night school. Mr. Huffaker states that during these ten years "not one cent has been spent for mechanical repairs. The V-belts have been replaced one time." You can save yourself trouble and make your teaching easier by specifying South Bend Lathes for your shop. Now is the time to send for information.

Kirkman Vocational High School
815 Chestnut Street
Chattanooga 3, Tennessee

September 18, 1951

Educational Director
South Bend Lathe Company
South Bend, Indiana

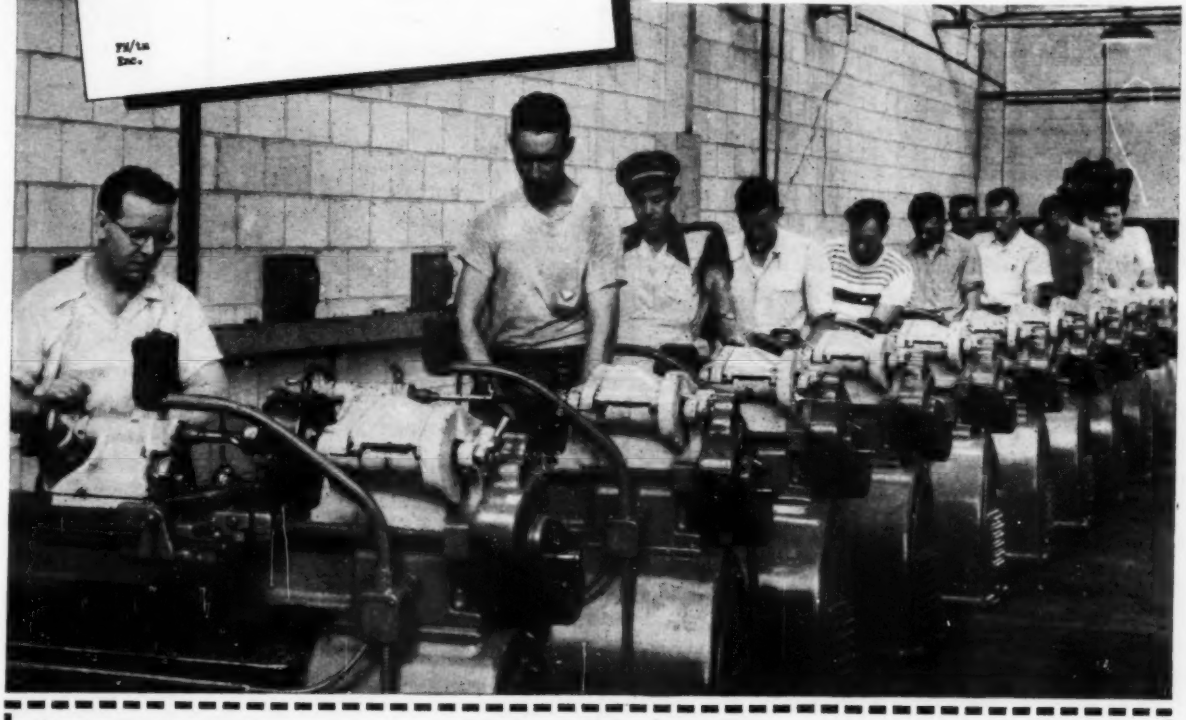
Dear Sir:

Occasionally I have seen photographs of school shops in your bulletins, showing the use of South Bend Lathes.

The enclosed photograph is a view from the machine shop of this school. The South Bend lathes pictured have been used day and night for ten years, and are still in excellent condition. You may use this photograph in any way you see fit.

Yours very truly,
Frank Huffaker
Frank Huffaker, Director

FH/ta
Enc.



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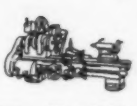
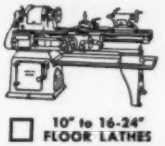
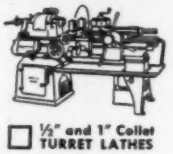


☐ 9" and 10" BENCH LATHES

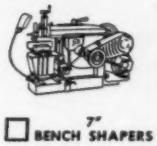


☐ 10" to 16-24" FLOOR LATHES



☐ ½" and 1" Collet TURRET LATHES

☐ 14" DRILL PRESSES



☐ 7" BENCH SHAPERS

Name_____ School_____

Street_____ City & State_____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

POP'S school of Filing

BETCHA "FILE FILOSOPHY" S GOT ALL THE ANSWERS
POP'S SURE GOT SOME STICKERS THERE
POP WANTS WE SHOULD USE OUR HEADS AS WELL AS OUR HANDS

IF THERE was ever a time demanding high industrial production and nation-wide conservation of materials and tools, it is now. Schooling mechanical trainees on files and filing pays off both ways in the long run. Three major rules are the keys:

1. ***Use the right file for the job.*** *Means better work, fewer rejects.*
2. ***Use files correctly.*** *Speeds work; lengthens file life.*
3. ***Use long-lasting files.*** *Conserves file steel; keeps file costs down.*

As file manufacturer, Nicholson is contributing every possible aid—through top file quality and engineered file designs. An excellent training school "primer" is—

"FILE FILOSOPHY," Nicholson's famous 48-page book on kinds, use and care of files. It unlocks the answers to such "quiz" questions as "Pop the Foreman" has listed here. It's FREE to school heads and instructors on individual requests.

NICHOLSON FILE COMPANY
47 ACORN ST., PROVIDENCE 1, R. I.
(In Canada, Port Hope, Ont.)

Here are twenty elementary questions about files and filing. If you can answer 18 or more, your rating is *Excellent*; 15 to 17, *Good*; 10 to 14, *Fair*; less than 10—well, "school's in."

1. Why are Mill files so named?
2. How long (how measured) is an 8-inch file?
3. What are the 4 general types of file teeth?
4. What designations cover the 4 general degrees of coarseness in the more commonly used files?
5. In a double-cut file which is the "overcut" and which the "upcut"?
6. What are Swiss Pattern files and how, in general characteristics, do they differ from American Pattern files?
7. Special-cut (or special-purpose) files are generally used on what metals or alloys? Name 4.
8. What machinists' files are *not* double-cut?
9. What is a G.P. Machinist's file?
10. What type files come in flexible as well as rigid form; and how and on what are they generally used?
11. What distinguishes a Super-Shear from the usual file of its class?
12. What is drawfiling?
13. What is a Lead Float?
14. Why is a Bastard file so called?
15. What are the chief characteristics of a Lathe file?
16. As distinguished by cross section, name 8 common shapes of files.
17. What extra quality is needed in a file for stainless steel?
18. How does a Brass file differ from an ordinary Flat file?
19. How do Foundry file teeth differ from those of a Flat file?
20. Name 6 "Do's" or "Don'ts" that will lengthen the life of any file.

NICHOLSON FILES
FOR EVERY PURPOSE

Vol. 41 No. 2

FEBRUARY, 1952

INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Published on the 15th of month preceding date of issue

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★ ★ ★ ★

This Month's Cover

The cover picture chosen for the February, 1952, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION shows a student operating a shaper in one of the machine shops at the Milwaukee Vocational and Adult Education Schools.

The photograph was submitted by Stanley O. Opsahl, instructor of photography at that institution.

★ ★ ★ ★

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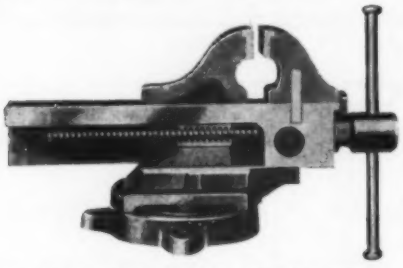

1. All steel slide gives greater capacity; guaranteed not to fail.
2. Steel screw, fully enclosed, protected.
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4. Easier lubrication due to outside retainer.
5. Full 360° swivel; positive locking base.
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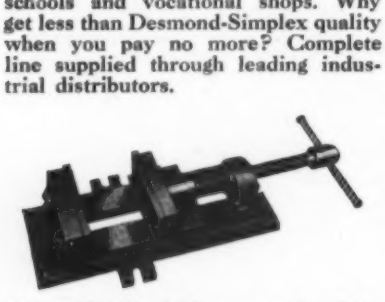
. . . and because they are *best values* for industry, they are *best buys* for schools and vocational shops. Why get less than Desmond-Simplex quality when you pay no more? Complete line supplied through leading industrial distributors.



Above: Rugged drill press and milling machine vise.

Below: Popular economy model continuous screw woodworker's vise.

DESMOND-SIMPLEX

STEEL SLIDE VISES

The Desmond-Stephan Mfg. Co. Urbana, Ohio

ASSOCIATION NEWS

THE 1951 AVA CONVENTION

The 45th annual convention of the American Vocational Association was held at Minneapolis, Minn., November 26 to 30, 1951. This huge gathering of teachers of industrial arts and vocational education, again demonstrated that as far as attendance goes, it is better to have the conferences near the center of our country, where teachers, supervisors, directors of practical education are found in greater numbers and where it is possible for them to attend meetings that bring them in touch with fellow laborers in the fields of education in which they are engaged.

At Minneapolis there was a registration of over 3500. This means that the total attendance was still higher. There were also more commercial exhibits than ever before—as a matter of fact, there were over 90 of them. The entire convention at Minneapolis has set an exceedingly difficult mark for future conventions to surpass.

The educational exhibits also were outstanding.

The opening general session was presided over by President H. C. Fetterolf on Tuesday, November 27, at 8:00 p.m. The main speakers on this occasion were Evelyn Millis Duvall, Chicago, Ill., and Fernando Romero, chief, vocational education section, Pan American Union, Washington, D. C. The subjects discussed were "Keeping People at Home," and "Inter-American Seminar on Vocational Education."

At the second general section held on Wednesday, November 28, at 8:00 p.m., the group was addressed by The Honorable C. Elmer Anderson, governor of the state of Minnesota, and Henry G. Bennett, administrator, Technical Co-operation Administration, Washington, D. C.

The AVA banquet and dance, held Thursday, November 29, at 6:00 p.m., was attended by a record-breaking number of AVA members. The main speaker at this banquet was The Honorable Dennis Chavez, U. S. Senator from New Mexico. At this banquet 26 new life memberships were presented to various educators and others interested in the American Vocational Association. The annual dance followed.

Industrial Arts Education

Dr. Homer J. Smith was program chairman of the industrial arts section.

The Wednesday morning session of the indus-

(Continued on page 6A)

THE SHIP PAYS TRIBUTE TO

Clyde A. Bowman

Clyde A. Bowman, Distinguished Son of Wisconsin:

In recognition of your loyal Military Service and your Inspiring Leadership in Education, we of THE SHIP salute you. Your untiring efforts for Greater Educational Opportunities for all . . . for the Advancement of Teacher Training . . . your Willingness and Effectiveness in Serving and Leading your Community, your State, and your Nation in Civic and Educational Enterprise . . . These, and your rich contributions as Lecturer, Teacher, Soldier, Writer, and Consultant will serve as an inspiration to those who follow.

Mr. Clyde A. Bowman, Dean, Division of Industrial Education, The Stout Institute, Menomonie, Wisconsin, we of THE SHIP are pleased and honored by this opportunity to pay tribute to you for your contribution to the advancement of The American Way of Life.

Given under our hand and seal this Thirtieth Day of November, One Thousand Nine Hundred and Fifty-One, A.D., at the Forty-Fifth Annual Convention of the American Vocational Association in Minneapolis, Minnesota.

THE SHIP

A social organization of representatives of firms in the field of vocational education.

Clyde C. Arnold, CAPTAIN
Harry W. Heard, DECK OFFICER
M. D. Mobley, PIRATE
Charles A. Roper
Vernon Larson
Fred Green
Kenyon S. Fletcher
E. Burnham Norton, COMMITTEE ON RECOGNITION OF VALIANT SERVICE
Paul H. VanTilla

Dean Clyde A. Bowman of Stout Institute, Menomonie, Wis., receives Ship's citation

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B&D SCREW DRIVERS will speed up training projects involving driving all types of fasteners in assembling wood, metal, plastic parts. Accurate, compact, easy to handle.

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B&D BENCH GRINDERS are quality-built for long service in your shop. Train students in tool sharpening, grinding, buffing, burnishing, cleaning operations.

B&D VIBRO-CENTRIC* VALVE SEAT GRINDERS train students to put mirror finishes on all internal combustion engine valve seats in a few seconds. Easy to operate.

B&D VALVE REFACERS are the finest equipment made for training students to grind factory-accurate angles in all types of internal combustion engine valves.

Train them for industry with industry's tools!

USING Black & Decker Tools to train your students gives them a head start toward doing better jobs in industry! That's because they'll find B&D Tools wherever they go . . . in factories, small shops and garages alike. And working with the same tools they learned to use in school gives them added confidence when they make the switch from school to shop.

What's more, you'll find it *easier* to *teach* with B&D Tools. They're husky, dependable, easy to handle, safe to use—all qualities that are hard to beat when you're working with green hands. And B&D Tools *cost you less in the long run*, because they outlast cheaper types! See your nearby Black & Decker Distributor for complete information on over 100 Tools and hundreds of accessories. Write for free catalog to: THE BLACK & DECKER MFG. CO., 680 Pennsylvania Ave., Towson 4, Md.

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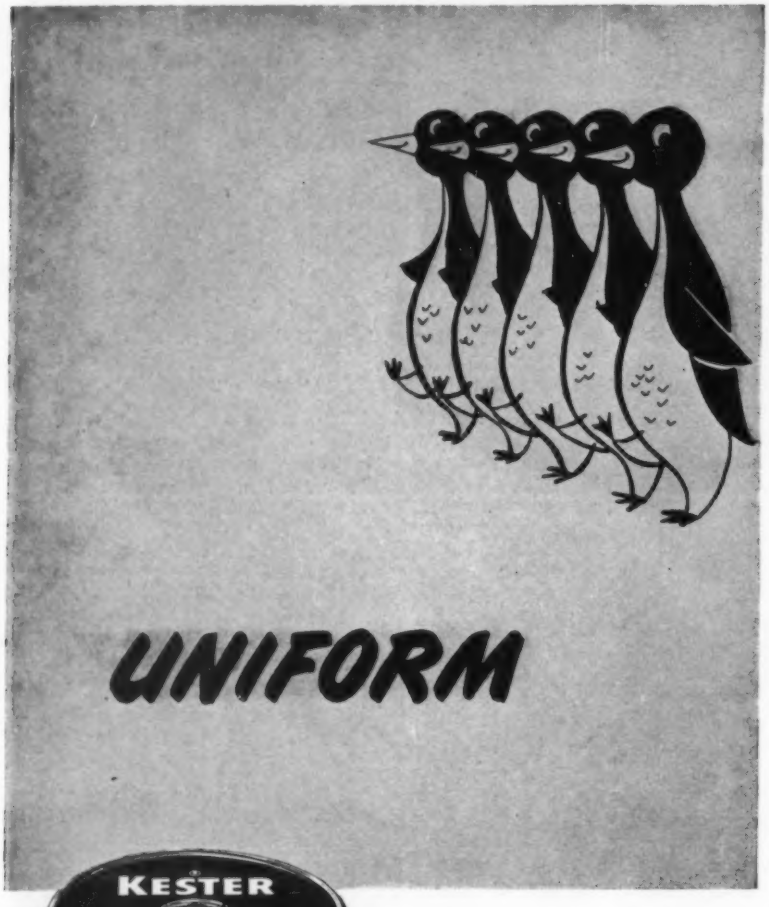
*Trade Mark Reg. U. S. Pat. Off.



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UNIFORM **Results for You**
UNIFORM **Results for the Student**

You should use Kester Acid-Core and Rosin-Core Solders in your classroom instruction because these are the Solders the Student will be using when he graduates into commercial fields.

It will be to your credit to make sure he is familiar with the well known and widely used Kester Flux-Core Solders.

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ASSOCIATION NEWS

(Continued from page 4A)

trial-arts teachers was under the chairmanship of Clyde A. Bowman, dean, division of industrial education, The Stout Institute, Menomonie, Wis.

Glenn Wagner, formerly state supervisor of industrial arts education, Albany, N. Y., presented an excellent demonstration of pupil interest projects.

Frank C. Moore, Cleveland, Ohio, spoke on "The Industrial Arts Teacher," and Dewey F. Barich, Dearborn, Mich., gave a demonstration on silversmithing. At the same time, on Wednesday morning, the industrial-arts supervisors and teacher trainers had a session at which Arthur B. Mays, Urbana, Ill., spoke on "Maintaining Standards of Achievement in Industrial Arts."

The question of "Campus and Off-Campus Practice Teaching" was then discussed.

The industrial-arts policy and planning committee also held a meeting on Thursday morning.

At the industrial-arts business session, held Friday morning, Roy G. Fales was chairman. Most of the time at this meeting was taken up by reports from committee chairmen on industrial arts, membership, research and publications, resolutions, safety, and revision of the bulletin "Improving Instruction in Industrial Arts."

At the industrial-arts luncheon meeting industrial arts club work was discussed.

Industrial Education

The program for this section was in the hands of E. M. Claude, Springfield, Ill.

The problems discussed by this section of the AVA were those which confront the National Association of State Supervisors of Trade and Industrial Education, National Association of Industrial Teacher Trainers, automotive education, vocational training for girls, defense training, co-operative training, training instructors for industry, technical training, apprentice training, and graphic arts education.

Vocational Guidance

The program chairman for this section was Guy O. Tollerud. The problems discussed were the needs of vocational guidance, local resources in guidance, counseling evaluation, and TV and vocational guidance.

Besides these industrial arts and vocational education meetings, there were those of the AVA sections on agricultural education, business education, distributive education, home-economics education section, each with discussions on many important problems, which made the 1951 AVA convention exceedingly valuable to the educators of the present and future boys and girls, and students of adult education in America.

At the house of delegates meeting, 25-year certificates were awarded to 28 Minnesota educators in the fields of teacher trainers, home economics, agriculture, industrial arts, and vocational education by the Minnesota Vocational Association.

The recipients of these quarter century certificates from the state commissioner's office were Dean M. Schweickhard, Auro I. Keever, S. K. Wick, Elmer Mueller, Guy O. Tollerud, Dr. R. M. Field, and C. R. Cochran.

There were five from St. Cloud, Minn.: Robert C. Miller, Ethelyn Weir, Constance Malmsten, Emery A. Johnson, and Arthur L. W. Johnson.

From Dunwoody Industrial Institute: Fred J. Landon, Walter W. Wentz, Allan L. Johnson, Herbert J. Pierson, and Walter F. Sahlin.

(Continued on page 9A)

40TH YEAR

Atlas PRECISION TOOLS MEET SCHOOL NEEDS BEST!

7 REASONS WHY

★ **Ruggedly Built — Take Rough Student Use Year After Year!**

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★ **Priced Low — Atlas Tools Fit Any School Budget!**

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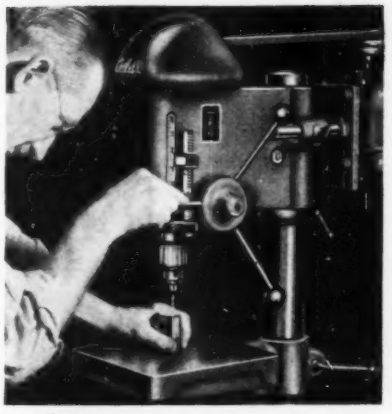
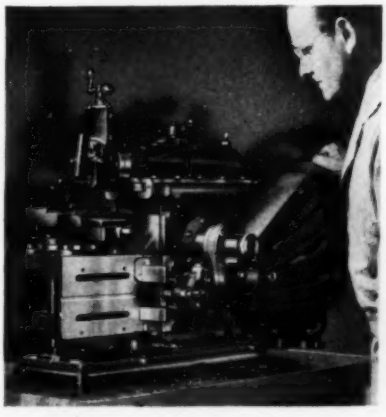


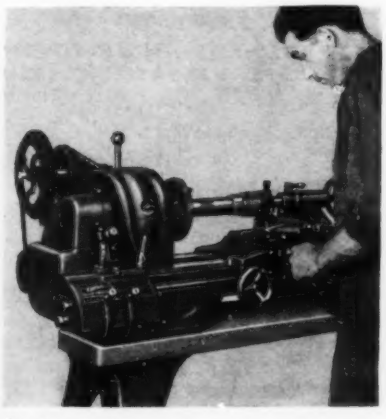
Atlas metalworking tools are today's best school shop buys! *They're priced as low or lower than any on the market* — yet give you more outstanding precision features (many of them Atlas "exclusives") for a lifetime of *accurate, dependable shop service.*

You'll appreciate their extra heavy, rugged construction, fine precision bearings, simplified operation, and exceptional versatility. Atlas tools help students learn quickly and get a broader understanding of the basic machining principles.

When you make up your equipment requisitions this year, keep *low-cost industrial quality* Atlas tools in mind. Send for the latest catalog.

DRILL PRESS — Finest drill press ever made for school shop use. Over 50 different floor and bench models — packed with new, exclusive features. Four ball-bearing head, new direct reading depth stop, extra heavy construction, smooth new accuracy and operation.





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MILLER — No finer miller for teaching the fundamentals of milling! Handles the entire range of operations with ease and accuracy. Compact, rugged, Timken bearing equipped. Eight spindle speeds, back-geared power.

LATHE — Atlas 10" lathes (24" or 36" between centers) are ideal for school shop use. Sturdy, accurate, Timken tapered roller bearings. Selection of 16 speeds, instantly reversible power cross and longitudinal feeds.

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the DELTA 14-inch Wood Cutting Band Saw

Master teachers are distinguished by their ability to instill qualities of skill and competence into the minds and hands of their students . . .

. . . And there's no greater help to them in their objective than quality tools like this Delta 14-inch Wood Cutting Band Saw—its built-in precision and ruggedness inspire confidence, skill and enthusiasm in the student from the moment he starts to work.

It's ACCURATE—The table is massive, 14 x 14 inches—and tilts 45° right, 10° left with a positive stop at the level position. Two widely spaced trunnions provide maximum table rigidity. Blade guides and ball bearing blade supports adjust independently with micrometer accuracy.

It's SMOOTH—Upper and lower wheels are carefully balanced and true running. Drive shaft and wheels are carried on sealed-for-life ball bearings, insuring trouble-free performance.

It's SAFE—Upper and lower wheels are entirely enclosed. A heavy wood guard covers all but the working portion of the blade. All guide control adjustments are at the front, for safety.

It's VERSATILE—Ripping is easily done and the rip fence has microset adjustment . . . skip tooth blades are available for cutting plastics, aluminum, magnesium, etc. . . . sanding attachment opens a whole new field of usefulness . . . height attachment increases capacity from 6¼ inches under the guide to 12¼ inches.

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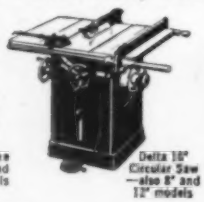
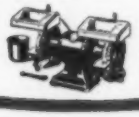
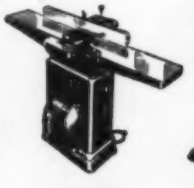
Delta 12" Lathe 4-speed and 16-speed models



Delta 10" Circular Saw —also 8" and 12" models



Delta Tool Grinder with Twin-Lite ® Safety Shields. Bench and Floor models



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ASSOCIATION NEWS

(Continued from page 6A)

Others were Dr. Ella Rose and Dr. Homer J. Smith, both of University of Minnesota; Raymond V. Nord, principal of Minneapolis Vocational High School; and Edward Waters, St. Paul.

Also C. W. Pope, Thief River Falls; Harry Lyons, Eveleth; Raymond Smith, Rochester; A. F. Dahlberg, Pequot Lakes; Calvin H. McClintock, Bemidji State Teachers College; Carl C. Perry, Little Falls; and Maurice J. Nelson, Mankato State Teachers College.

Officers elected for the AVA for the coming year are:

President, Harry C. Schmid, state director of vocational education, Minnesota;

Treasurer, Chas. W. Sylvester, assistant superintendent of schools in charge of vocational education, Baltimore, Md.;

Vice-president for agricultural education, Mark Nichols, state director of vocational education, Salt Lake City, Utah;

Vice-president for business education, W. R. Blackler, chief, state bureau of business education, Sacramento, Calif.

The next AVA convention will be held in Boston, Mass.

The Ship's program followed immediately after the House of Delegates meeting. As usual it was received with great applause by all. Clyde C. Clack, Binney & Smith, New York, acted as Ship's captain; and Harry Sears, American Technical Society, Chicago, Ill., was the deck officer.

Chas. A. Roper, McKnight and McKnight Publishing Co., Bloomington, Ill., presented the Ship's citation, which this year went to Clyde A. Bowman, dean, division of industrial education, The Stout Institute, Menomonie, Wis.

INSTALLATION OF E.P.T. ALPHA Xi CHAPTER

On April 28, 1951, a chapter of Epsilon Pi Tau, national honorary society in industrial arts and industrial-vocational education, was installed on the campus of Iowa State College, Ames, Iowa. This chapter is designated as the Alpha Xi chapter of Epsilon Pi Tau.

The initiation team consisted of Albin V. Larson of the State Teachers College, Peru, Neb.; Lawrence C. Secrest of the State Teachers College, DeKalb, Ill.; and Ernest Rawson and Robert S. Swanson of The Stout Institute, Menomonie, Wis. The charter address was given by Dr. William E. Warner, professor of education at Ohio State University.

Laureate citations, special awards recognizing length of service and outstanding contributions in the field of industrial education, were presented to C. T. Dean and to Prof. Lowell L. Carver, and to Harry Carmichael, state supervisor of trade and industrial education.

The summer initiation was held on July 14 with twenty-four new members coming into the chapter. Three of the initiates were undergraduates, two had graduated in June, and the remainder were graduate students or men engaged in teaching or administration work in industrial education.

CONNECTICUT INDUSTRIAL ARTS ASSOCIATION

The Connecticut Industrial Arts Association, one of the oldest of its kind, has held two successful meetings during the past year. In the spring it held a two-day conference at the Teachers College of Connecticut with an estimated attendance of over 500. Professor Alonzo Grace of the New York University School of Education was the principal speaker. His topic and convention theme was "Identifying Needs of Youth — Curriculum Revision."

At a meeting at New Haven during the week of October 28, the Connecticut Industrial Arts Association held a luncheon meeting at which time A. A. Pupillo was principal speaker. His topic was "Curriculum Changes to Meet the Needs of Youth." In addition to the state association, Connecticut has four smaller associations which meet more frequently. These associations have already planned fifteen meetings for the coming school year.

The Teachers College of Connecticut's chapter of Epsilon Pi Tau has held two initiations during the year increasing its membership by 35.

The present plans for industrial arts in Connecticut for the coming year indicate a variety of new and continuing projects. Included in the over-all plans are the following:

1. State-wide conferences during fall and spring on shop safety;

2. The continuation of the state leadership council in industrial-arts education;

3. A two-day spring conference of the Connecticut Industrial Arts Association to be held at the Teachers College of Connecticut on April 18–19, 1952.

— *John B. Fuller*, President

(Continued on page 18A)

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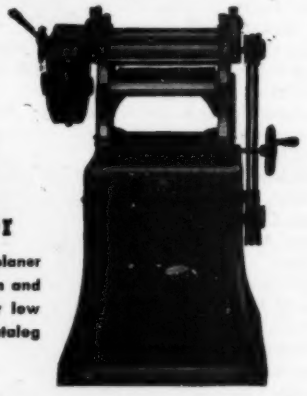

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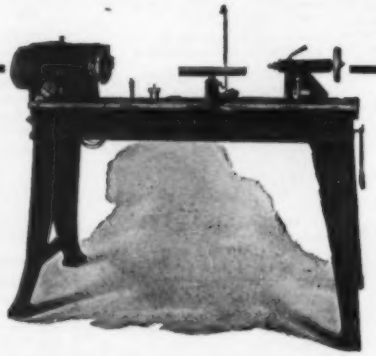

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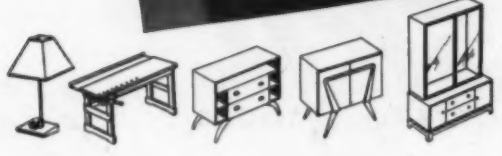

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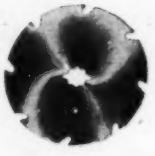

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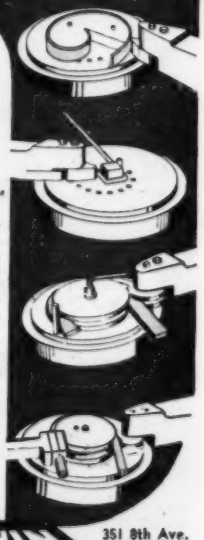

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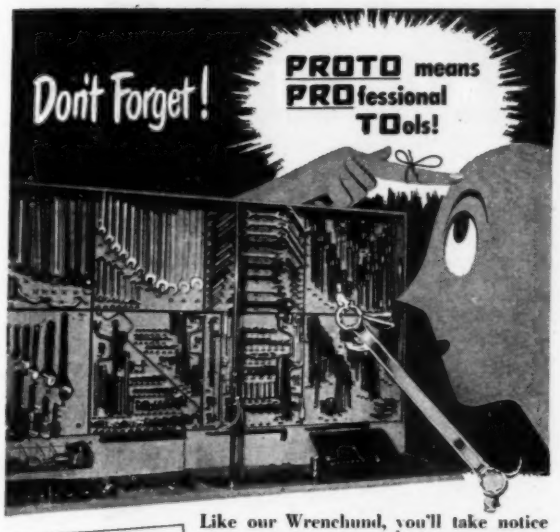

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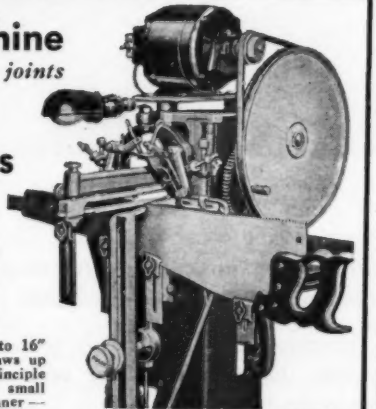

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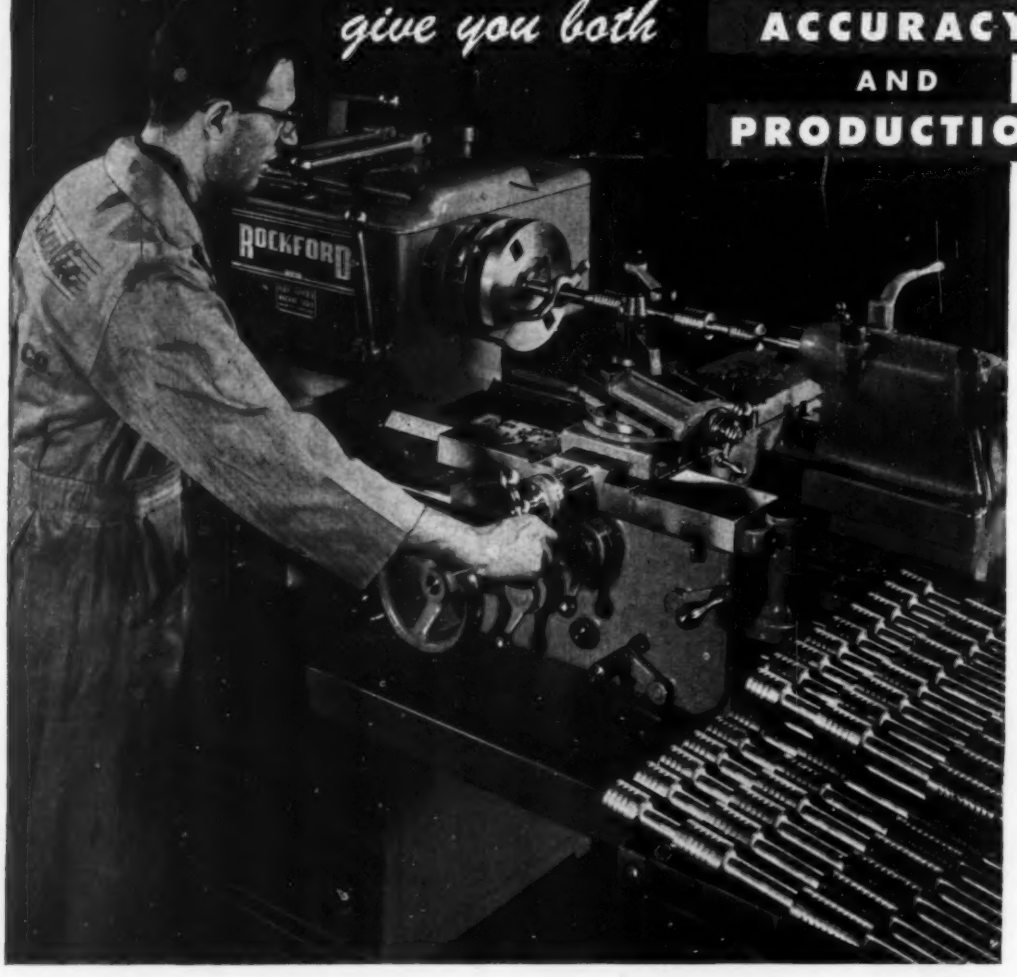

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INDUSTRIAL ARTS *and* VOCATIONAL EDUCATION

FEBRUARY 1952

Maintaining Standards of Achievement in Industrial Arts*

ARTHUR B. MAYS
Professor of Industrial Education
University of Illinois
Urbana, Ill.

There are certain trends in present-day educational theory and practices that serve to discount the importance of high standards of skill and achievement. The result has been, in many instances, a disregard, on the part of pupils and teachers alike, of the fundamental importance of doing well whatever one undertakes; and in far too many cases pupils have developed an attitude of satisfaction with unskillful performances and superficial knowledge. This condition has seemingly come about as a result of an overemphasis upon certain desirable reforms in traditional methods of teaching. It is always dangerous in the history of human progress to discard the good with the bad of established concepts and practices, and substitute the new without regard to the important, time-tested values in the old. Unfortunately education, throughout its history as a field of professional study, has been disposed to grasp with both hands every new theory that appears to be worthy and to drop the best and most needed values of old ideas and procedures. Industrial arts has been affected by this unfortunate trend along with other phases of general education and it is time for those engaged in this important part of the educational program to reconsider some of the fundamental values in this significant area of general education that are in danger of being increasingly disregarded.

From childhood throughout life one is judged by the degree and quality of his achievements. Indeed, one's assessment of his own qualities is based, in large part, upon his consciousness of the degree to which he has achieved his purposes in life. The modern world is far more interested in what one can do well and has accomplished than in who his father was or from what school he was graduated. Hence a major objective of all education, whether organized or incidental to the daily out-of-school experiences, should be the ability to achieve. Education should also be concerned with developing both the will to achieve and the habit of achievement. Society is increasingly intolerant of failure and of work poorly performed. The further fact that the modern world is highly competitive makes urgent the necessity of the possession of the desire to achieve and the habit of achievement. Any theory of education that does not place high on its list of objectives the habit of achievement and the will to achieve is an unsound and dangerous theory for schools to be guided by in a time like the present. It follows, then, that a major purpose of every teacher should be so to teach that his pupils will form the habit of achieving whatever they set out to accomplish, and that they will come increasingly to maintain high standards of achievement.

Industrial-Arts and Achievement Standards

The industrial-arts teacher occupies a peculiarly favorable position for developing in his pupils high standards of achievement and the habit of doing well whatever is undertaken. This is true because of the inherently concrete, interesting, and practical character of the work of school shops and drafting rooms. The ends can be clearly visualized, the means fully understood, and the skills necessary for achievement thoroughly mastered. Therefore, a major obligation of the industrial-arts teacher is to maintain high standards of accomplishment in all that is attempted in shop and drawing room. One of the fundamental weaknesses of much modern educational practice is the failure to insist upon high standards of achievement in the schoolwork of pupils. It is held by some that so long as a pupil is expressing some idea he has conceived it is not important how he expresses it. Such a notion may possibly be acceptable with reference to very small children, though it is questionable even in that case, but to apply it to the teaching of boys and girls of the junior and senior high school is an utterly unsound practice that is unfair to those so taught. It is unfair in that it produces in their minds a wholly false idea concerning the demands that the out-of-school world makes and will later make upon

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them. Skill and correct procedures in work are essential elements in all important achievement and the *ideal* of skill in work can only be developed through an invariable insistence upon the skillful and correct performance of all tasks undertaken. The acquisition of skill is itself an achievement of great educational value. When the work of shops and drawing important work habit is that of working as to be within the powers of the pupils to be taught, it is possible to maintain high standards of achievement; and when the level of work is so adjusted to the capacity of pupils it is unfair to them to permit low standards of performance and achievement.

Work Habits, Technical Knowledge, and Skills

There are at least three areas of teaching where it is specially important to maintain high standards of achievement. They are: first, achievement in the development of good work habits and desirable habitual attitudes; second, the acquisition of technical knowledge and understanding; and third, the development of manual and other skills. In all three there are at least two fundamental conditions of success, namely, the teacher must possess and maintain in his own work high standards of achievement, and the pupils must know what the teacher's standards are for them and come increasingly to adopt for themselves those standards.

With reference, first, to achievement in the development of good work habits and desirable habitual attitudes, it is necessary that the pupils shall know what are good work habits and desirable attitudes. Few will begin their school-shop experiences with good habits of attacking and doing work. The work habit that seems to be most desirable is that of always analyzing every undertaking into its procedural elements and planning the procedure step by step to the desired end. Few homes consistently train children in these steps, yet the development of the habit of analysis and planning when undertaking any enterprise is one of the most important outcomes to be achieved by instruction in industrial arts. No other habit will be of greater value throughout life and no other school subject is better adapted to produce it as a life habit than is industrial arts. But this habit cannot be developed by leaving pupils to their own devices, nor by a teacher who is not constantly alert and fully aware, every minute he is in the shop or drawing room, of what is happening around him. Neither can it be formed successfully in pupils by a teacher who does not himself possess the habit and exhibit it in all his teaching. Another important work habit is that of working with concentration and persistence until a job is completed according to plan. It is not difficult to demonstrate in shops and drafting rooms the value of this habit, and the competent teacher can help his pupils to establish it as an ideal to be striven for in all one does in life. A third work habit is orderliness and carefulness in the use and maintenance of tools, materials, and equipment. Again, it is true that few young persons are taught to work systematically and carefully in their homes, and few are trained properly to care for the things they use. Yet these are highly desirable habits that all should possess, and there are few places where they can be so easily developed as in the industrial-arts shops. Their development will depend upon the standards of orderliness and equipment maintenance enforced by the shop teacher. One other work habit of great importance may be designated as the habit of safety. Experience has taught that safety in the shop, on the highway, on the playground, in the home, and elsewhere is insured only when individuals possess thoroughly established habits of being constantly alert for and aware of dangerous conditions in their environment, and the habit of behaving and working in a safe manner. The habit of safety can be developed in school industrial-arts shops, but only when the teacher possesses and maintains high standards of safety in all shop activities and in his control of equipment arrangement and other permanent features of the shop environment. The development of safety habits should be considered by both teachers and pupils as one of the major outcomes toward which to strive in their industrial-arts experiences.

Closely related to good work habits are desirable attitudes. The attitudes of helpfulness, co-operation, pride in work well done, interest in learning, and interest in becoming increasingly proficient, are all essential for continuous growth and success as a learner in industrial arts; and when they become habitual attitudes, as a result of being consciously developed as ideals of all work and of life, they are priceless possessions. These attitudes can and should be developed early in life. Industrial-arts activities are particularly well adapted to the development of such attitudes, but they are not likely to be acquired when the industrial-arts instruction is unplanned and carelessly conducted. As in the development of good work habits, there must be clearly understood standards of achievement with reference to the growth of these desirable attitudes. What is meant by an attitude of helpfulness, of co-operation, of dissatisfaction with less than good work, and an earnest desire for more knowledge and more accurate understanding, must be clear to both pupils and teachers. Attitudes are emotions, that is they are feelings toward something, and they are usually the results of knowledge, imitation, and suggestion. It is therefore important that the teacher shall exhibit the desired attitudes in all his contacts with pupils and at all times whenever he is under their observation. Furthermore, the meaning and importance of these attitudes need to be formulated in words and discussed with the pupils on all appropriate occasions. They will not be outcomes of industrial-arts instruction unless the teacher possesses high standards of achievement with reference to their development in his pupils, and unless he insists on and inspires behavior that is conducive to their cultivation.

Technical Knowledge

The acquisition of technical knowledge concerning tools, machines, industrial processes and materials is a major objective of industrial arts in the secondary school. What knowledge and understandings are to be acquired must be clearly known by both pupils and teachers, and both should strive for thorough, accurate knowledge, and clear understanding of the significance of the knowledge acquired. Here, again, the inspiration to know thoroughly comes chiefly from a teacher who exhibits mastery of his subject field. Teachers who are not intellectually curious, and who are not careful, persistent, and enthusiastic students are not likely to inspire a love of learning and knowing on the part of their pupils. Neither can teachers who do not insist on accurate understanding of meanings lead their pupils to high standards of achievement in learning. To permit the acquisition of necessary technical knowledge to be merely an unplanned, incidental

feature of shop and drawing experiences will result in inadequate and superficial learning, low standards of achievement in understanding, and the habit of being satisfied with less than thorough knowledge. Such a habit constitutes a distinct handicap in modern competitive life.

Acquisition of Skills

The maintaining of high standards of achievement in the development of shop and drawing skills also constitutes a major responsibility of the industrial-arts teacher. Nothing leads more surely and quickly to disgust and frustration on the part of learners than the consciousness of unskillful performances in their work. No one is more aware of unskillful and inaccurate work than the pupil himself. To approve unskillful performances on the ground that the pupil is expressing in his own way a creative idea formed in his imagination, is unfair to the pupil. Originality and creativity are always desirable in school shop work, but unskillful execution with tools and materials of creative concepts of design and construction are never desirable above the lowest elementary grades. Much of the most important educative values of the industrial-arts experiences are lost when high standards of skill are not maintained. The standards of skill expected should be discussed with pupils and fully understood by them, and the teacher should make clear the great importance of skillful performance in all their work. The standards of achievement in every aspect of modern life are today higher than they ever have been in the history of civilization, and it is unfair to pupils in school to fail to try to impress upon them that fact. Life today is hazardous for those who do not possess accurate knowledge and who can not meet the ordinary demands of the social and economic environment with skill in and understanding of correct procedures. Skill, therefore, should come to be an ideal in every phase of living, and should be developed in every other area of general education as well as in industrial arts. It is equally as important in the non-vocational aspects of modern life as in the vocational activities. Neither skill in work nor the ideal of skill in all one's undertakings will be developed through the school unless teachers maintain high standards of skill in their demands upon those they instruct.

In all that has here been expressed the responsibility of the teacher for the maintaining of high standards of achievement has been emphasized. It is the writer's firm belief that the school does not have the right to be tolerant of low standards of attainment. It is, of course, recognized that there are great individual differences among pupils, but when the work undertaken by them is adjusted to their capacity to do it well, only high standards of achievement within the limits established should be tolerated, for the good of the pupils. There is little likelihood that as an outcome of school experiences boys and girls unguided by skillful teachers who possess high standards of self-discipline and achievement will ever acquire the habits of self-management and skillful performance that are so greatly needed at this critical time in human history. There surely is no other part of the program of general education that is inherently better qualified than is industrial arts to produce the desirable habits and standards of behavior and achievement. In the school shops and drawing rooms the obvious and immediate outcomes of both desirable and undesirable kinds of social behavior and technical procedures give to this phase of education a unique role in the school program of instruction. The responsibility of the industrial-arts teacher is, therefore, great to utilize fully the educative possibilities in his field of instruction. Among these are the habits and ideals that will lead to the development of high standards of skillful work and achievement, both now and throughout the later life of the boys and girls in the industrial-arts classes.

Accreditation of Industrial Arts Teacher Education*

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Accreditation of higher institutions has become a problem that holds many ramifications, many of which are controversial. The number of agencies involved are so many as to require special staffs with offices to deal with the problem in the large universities. These agencies accredit institutions as a whole as well as the various departments, and there is an overlapping of standards and methods of evaluation to a point where there seems to be a need for evaluation of the purposes and the standards of the many agencies.

Time and irrelevance preclude consideration of more than just a few of these agencies or reference to them in this paper. However, there are the following four classifications: Association of American Universities, Regional Associations (6), State Universities, and State Departments of Education.

Colleges and departments of teacher education are primarily concerned with one national and one regional agency. The American Association of Colleges for Teacher Education is the national agency. Here in the upper Midwest the North Central Association of Colleges and Secondary Schools is the regional agency. It includes 19 states in its scope of accreditation. Those of you who represent

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institutions outside of this area know your particular regional agency.

The purposes of accrediting associations are to stimulate improvement of an institution or department. The operating policy is usually one of general helpfulness rather than one of inspection and policing.

Accrediting Agencies

The North Central Association includes eleven major standards: purposes, faculty, curriculum, instruction, library, student personnel service, administration, finance, physical plant, institutional study and athletics. The standards are stated in general terms and apply to the institution as a whole rather than to departments. In so far as industrial-arts departments are concerned now the most serious problem is with the standards relating to library and staff competency. Basic industrial-arts books are not included in the criteria, and special competency of the staff is not given consideration. The advanced degrees are emphasized as a requirement, yet the doctorate is generally a scarce possession in industrial-arts teacher education and does not lend heavily to the over-all competency in the special field. In most instances the work for the doctorate is often of such nature as to tend to educate the holder away from the field.

Teachers in dentistry, engineering, fine arts, law, medicine, music, and nursing are exempted because the Ph.D. is seldom acquired in these fields. Yet there are more such degrees in the foregoing areas than there are in industrial arts. This point should be taken into account in a study of our problem.

The American Association of Colleges for Teacher Education includes in its criteria: admission, selection, guidance and placement, requirements for graduation, preparation of faculty, teaching load of faculty, student teaching facility, curriculum — instructional patterns, student health and living conditions, library, buildings and grounds, financial support, appointment, academic freedom and tenure. In this association, there is an annual rating on all eleven items whereas in the North Central, two standards are usually considered each year. The foregoing standards are of general nature, or rather for the whole institution. A special department may be weak, yet because of a general high rating of the institution, the department is assumed to be strong.

What should be done about specifically accrediting industrial-arts teacher education departments? There are a good many differences of opinion as to whether it should be attempted and how it should be done, if attempted. There are persons who believe that a detailed check list of inspectional items should be administered by recognized leaders in industrial arts. There also are persons who believe that a program of general helpfulness should be established and administered as a function of one of the established accrediting associations. There are differences of opinion as to what constitutes industrial arts and its aims. There are those who believe that industrial arts should have salable values to senior high school students, and there are those who believe that salable values are unimportant. There are differences in interpretation of the meaning of the terms general education, general cultural education, general professional education, curriculum, courses of study, resource units, methods, drafting, and shopwork. There are those who see no difference between industrial-arts teacher education and industrial arts in the secondary school. And there is the question whether the industrial-arts teacher should possess skill so he can give good demonstrations of acceptable practice or whether he needs only to tell about it. The differences are many and may point to a need for some kind of accreditation procedure.

Should accreditation for industrial-arts teacher education be left to one or both of the teacher accrediting associations; or should it be done by a group of our own leaders representing one of our associations? The latter cannot easily be done because most institutions would not accept the findings. And who would select the group? At the present time leadership in industrial arts is worrying a good many capable and respected men in the field to a point where it interferes with a sound development of industrial arts as a service to the youth of our country. It has almost come to be a question of who utters *what* rather than whether there is a functional service to be rendered our youth.

Who Should Have Charge of Accrediting Industrial Arts Teacher Education

Two very important doctoral studies have been made on the subject of accreditation in industrial-arts teacher education and one is now under way. Dr. Ralph Gallington made the study *Teacher Education in Industrial Arts with Special Emphasis on Evaluative Criteria.* This is a doctoral study made at Washington University in 1947.

Dr. Bernard S. Proctor wrote "Accreditation in Industrial Arts Education" after his doctoral study at Ohio State University in 1950. Both of these reports are important and should be valuable in connection with a third study now under

Student working in the patternmaking department of the Milwaukee Vocational and Adult Schools

— Photo submitted by Stanley O. Opsahl, teacher of photography

way by Gerald Baysinger of Wayne University. He is working on a doctoral thesis at the University of Michigan.

Any agency established for accreditation must itself have the equivalence of accreditation; therefore, difficulties would arise if a special group should decide on its own program. The following are the criteria for recognition of the accrediting agency itself. This was prepared by the U. S. Office of Education in consultation with the Committee on Accrediting Procedures of the American Council on Education.[1]

I. The accrediting agency should have published criteria for recognizing institutions, and a published list of recognized institutions.

II. Among other criteria for recognition of institutions, the agency should include:

A. A student body beyond twelfth-grade level;

B. A faculty with advanced training sufficient for a post secondary school program;

C. Financial resources sufficient to provide a stable basis for operation;

D. Institution legally authorized within its own state to provide a program of higher education;

E. Institution's program shall be in operation for long enough time to permit a reasonably critical judgment of its program;

F. The minimum length of a program for recognition shall be at least two academic years beyond the high school.

III. Admission to the accredited list should be based on a visit to and a report concerning the institution by competent examiners.

IV. The agency should have an adequate and systematic means of checking up on those institutions it has recognized, to see that they continue to maintain programs of satisfactory quality.

V. To be recognized an agency should have been in operation for at least 3 years since the time of its first published list of institutions.

VI. In principle the Office of Education should recognize only one accrediting agency in any given professional field.

It would seem from the foregoing that the job is one for an established agency or agencies, national or regional. The American Association of Colleges for Teacher Education is the national agency. It co-operates with the respective regional agencies.

At Madison, Wis., in August, 1950, AACTE held its School for Executives. It was decided that departmental accreditation would be considered on a permissive basis. Special departments could present their criteria if they so desired and these criteria would be included in an over-all institutional accreditation plan. The chief state school officers in meeting at Biloxi, Miss., in 1950 committed themselves to approving only teacher education programs in colleges and universities in their respective states that are accredited by AACTE.

Present at the AACTE meeting in Madison were President Verne C. Fryklund, of Stout Institute; President Harvey M. Rice, of Oswego State College; and Gerald Baysinger, of Wayne University. There were college officials present who reported interests in their respective institutions for study of various departmental criteria. There seemed no time to lose if consideration was to be given to inclusion of industrial arts. It was agreed that the several professional groups of industrial-arts teachers should be consulted.

Since Fryklund is chairman of the Mississippi Valley Industrial Arts Conference, whose members also belong to other organizations, he agreed to place the problem of accreditation before that body in 1950 by way of a half day conference. It was also agreed that it should appear on the agenda of the industrial-arts section of the AVA in Miami in 1950. It also should be presented as one of the considerations of the American Industrial Arts Association meeting in New York City in 1950. All of these came to pass.

Dean M. R. Trabue, of Pennsylvania State College, School of Education, is chairman of the Accreditation Committee of the AACTE. There would need to be a representative group of industrial-arts teacher educators to act as a committee to co-ordinate with AACTE. In consequence of deliberations of the groups afore-mentioned, there came the following representative committee:

American Association of Colleges for Teacher Education: Verne C. Fryklund, The Stout Institute, Menomonie, Wis.

American Industrial Arts Association: DeWitt Hunt, Oklahoma A and M College, Stillwater, Okla.

Industrial Arts Section — American Vocational Association: Gordon O. Wilber, State Teachers College, Oswego, N. Y.

Ex-Officio Member: John Ludington, U. S. Office of Education, Washington, D. C.

National Association of Industrial Teacher Trainers: Dewey Barich, Kent State University, Kent, Ohio.

Member at Large: E. E. Erickson, Santa Barbara State College, University of California, Santa Barbara, Calif.

Industrial Arts Conference of the Mississippi Valley: John Friese, Pennsylvania State College, State College, Pa.

American Council on Industrial Arts Education: Walter R. Williams, Jr., University of Florida, Gainesville, Fla.

Secretary: Gerald Baysinger, Wayne University, Detroit, Mich.

Because of his position as president of a member college of AACTE, Fryklund was drafted as chairman. Gerald Baysinger, of Wayne University, present at the AACTE School for Executives at Madison, offered to co-ordinate the work of the committee by way of a doctoral dissertation and also agreed to serve as secretary of this committee.

Baysinger has studied the current literature and has held consultations preparatory to drawing up criteria that would be submitted for consideration by the committee. These criteria would advance to doctoral study and be developed objectively. They would be submitted in the form of tentative standards to all departments of industrial-arts teacher education for review and recommendations. Majority opinion could be adopted for the standards. The foregoing steps briefly outline the operating procedure.

Baysinger has reported good progress and tentative standards will soon be in the hands of the committee. After revisions have been made, the new standards will be sent to the various departments. Following are questions that have already arisen:

1. Should there be standards of a kind that respect somewhat differing philosophies of industrial arts, or is there just one philosophy and what is it?

2. Isn't institutional or departmental accreditation at its best, an indirect measure of the success of graduates in the field?

3. Many departments prepare both industrial arts and vocational teachers. Both

[1]Theresa Birch Wilkins, *Accredited Higher Institutions 1948*, Federal Security Agency, Office of Education, Bulletin, 1949, No. 6, Washington, D. C., 1949.

serve our youth well. Does this deserve consideration in establishing standards?

4. Should the problem of the "60 per cent" be taken into account? What about publications such as "Education for all American Youth" (NEA) and "Schools for a New World" (ASAA — Yearbook 25). Should industrial arts in upper secondary levels contribute to occupational adjustment of our youth?

5. Should there be specified content for industrial-arts teacher education or should the natural course of events take care of it?

6. Are there differences between industrial-arts teacher education and secondary school industrial arts as to shop types, methods, and philosophy?

7. The foregoing point raises the question whether the standards should be flexible enough to provide for upgrading of teachers in terms of educational preparation, practical experience, and teaching experience? Or, should it be on an all-or-nothing basis even though it may not be consistent with the present status of the teachers in the field.

8. Should standards take into account whether the teachers and the students actually use the equipment available? This may be related to item number two.

9. How important is the service area in planning a program? A service area can have a stagnating as well as helpful influence. Perhaps research and experimentation on the college level will find an answer to this question.

10. Should the teacher education program include minors as well as majors? There are arguments pro and con.

11. Should there be a general shop or unit shop program, all of one kind or nothing? Or, should good judgments and compromises in favor of the taxpayer, present equipments and enrollments, be considered?

12. Can we do without books? Should certain industrial-arts books, bulletins, and magazines appear in the library?

13. Should the standards be such as to require training of teachers for elementary school, junior high school, and senior high school? Or, should we train teachers without consideration of level of eventual service?

14. Should we tackle the industrial arts — coach combination?

15. Should an industrial-arts teacher possess maintenance of equipment skills as well as construction skills? Should his shop and equipment always be in top order? Are there basic competencies?

16. Should safety education be an integral part of the program?

17. Should there be depth of skill on the part of the teacher in one or two activities or a little in a good many? Would his eventual service in junior or senior school be considered?

And so this paper closes with a scattering few questions, more or less important, remaining and untouched. The task ahead is chock-full of variables and there seems to be no god to bring us sudden and complete comfort. There may never be a full and satisfactory set of standards for industrial arts. There may always be some dissatisfactions. Did you ever hear your college president fuss about the accrediting standards now "imposed" on the college? And it seems now that he is to get more.

Under whatever philosophy of industrial arts, or plan for accreditation, it is satisfying to know that our youth can acquire the know-how for the fashioning of the materials of industry into objects of need and of comfort and of beauty. We should be allowed to do that much, and to do it properly and safely, with its attendant learnings, beginning with simple materials in the grades and including the more difficult materials in the upper levels of high school. Each material has its special know-how. Let's do that much sincerely with just a few ethereal claims attending our efforts.

Complete change of practice or philosophy seems unnecessary. Refinement should rather be our goal. The enumeration of issues in this discussion does not imply irreconcilable differences. In fact, these issues seem neither black nor white. Some shade of gray may perhaps achieve the improvement we are seeking. My purpose in raising these issues has been to present them as a catalyst for thought so that means may be found to establish standards which will lead industrial arts to new heights of achievement.

An Outsider Looks In*

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You will note that the title of my talk, "An Outsider Looks In," leaves a rather wide-open field for mounting a horse and galloping off in all directions. I could have considered such questions as: *"What's Next in Industrial Arts?"* or, *"What Is Good About Industrial Arts?"* or, *"What Are the Differences Between Industrial Arts and Vocational Education?"*

But I propose to keep closer to the ground and tackle a very simple and fundamental idea which I feel there is some danger of forgetting. My subject is: *"Reverence for Skill."*

By skill I mean every kind of skill that adds to our material comfort and spiritual growth. From *reverence* for skill grows the *desire* to be skillful. As a skill develops, knowledge also develops, for skill — after all — is wisdom in action.

Civilization began with skills — the skills of shelter building, of hunting, of agriculture, and the cultivation of inhibitions.

I believe that every child has an inherent curiosity *to know* as well as a natural reverence for skill that grows in stature under liberty in law. That is our starting point. How do we develop the desire for

*Address given at the 1951, A.V.A. Convention at Minneapolis, Minn.

skill? To live in an atmosphere of real craftsmanship is a fine way to get an introduction to the beginning skills of any craft. This holds true whether it is a teacher-student relationship or a teacher trainer-apprentice teacher relationship. Watching a master work is a simple, direct method of learning a skill. It is also an experience in discipline.

But the process must not stop there.

A student will not be worth his salt if he doesn't soon turn from a copycat into a self-propelled person with the idea of someday surpassing the skill of the master. This challenge must be continually in the air if we are to make sure that the younger generation will turn out better workers than their forefathers.

Developing the Essentials

Every teaching job in a teacher-training school or school shop is tied to three essentials: *skill, knowledge,* and *attitude.*

The shop teacher especially has a unique opportunity to develop not only skill but also a healthy attitude toward work, tools, and machines. Reverence for a teacher's skill leaves a mark on the student that is not easily measured or removed.

A school shop can thus become the center of real work relationships as we make our projects and methods more directly related to the real life of the school or the community.

A shop teacher or teacher trainer should be a master of his particular skills and of the related knowledge of the craft which he teaches in exactly the same way that a good English teacher should be a master of grammar, rhetoric, and literature. A shop teacher will soon lose his distinctive quality and his reason for being in the shop if he does not have the skills that his students can admire with reverence. Whenever there is evidence of a shop degenerating into an uncontrolled playroom, the main value of industrial arts has gone out the window.

I think it is possible to walk into a school shop and recognize the high quality of the teaching. There may be noise, but there is no confusion; the individuals know how to use the tools and machines which they have at their disposal.

It is the teacher who creates this wholesome atmosphere of the shop — an atmosphere of serious, yet happy, work relations. It is the teacher who leads the boy to discover the joy that comes from work in which he has expressed his personality through tools and materials.

The greatest satisfaction of the artist, the sculptor, the metalworker, and the woodworker comes from this. It is something you learn by *doing*. It is a real satisfaction to know that there are a great many teachers of industrial arts and vocational education who are definitely making contributions to character, as well as training hands.

The Teacher's Skill Leaves a Lasting Impression

A good teacher is one who *lives* with his students, sharing their problems, their hopes, and their aspirations. He does this, not from any sense of duty, but rather because he finds pleasure in helping young minds solve problems, improve their skills, and grow in mental maturity.

In every class in school there are some youngsters whom the experts have not yet classified, and for whom they have yet to plan. The school shop is often the only place where many of these students find joy in the learning process. A shop teacher has unusual opportunities for really getting to know his students, and particularly those who excel in this type of work.

The greatest opportunities for developing real craftsmanship and good attitudes toward work come in hours outside of a regular classroom. True, this is an extracurricular investment by the teacher; but special attention given to a boy who has a flair for handling tools and making things is an investment in social security which will bring large returns. It is from this group of youngsters that our surgeons, engineers, research workers, tool designers, toolmakers, experts in building construction, silversmiths, and good shop teachers will come.

It has been my privilege to note in talking with business and professional men that a large number of them do remember their contact with the shop teacher. What they learned from their craft teacher in the way of skills and attitudes toward work has paid off in big returns.

Such teachers are often the great unknown ones. For instance, I do not expect that many of you will recognize the names of John Elliot, Percival Chubb, Augustus Klock, Wyllis P. Kent, Peter Dykema, William Oberlies, A. W. Richards, or Leonard Wahlstrom. All of these men were teachers at the Ethical Culture School in New York during the period between 1908 and 1918, when I had the privilege of being associated with them as a teacher at the same school. Two of these men had Ph.D. degrees, some had no scholastic degree. Yet I know of no group of teachers — master teachers in art, music, science, ethics, or shopwork — whose influence on students had such a deep and far-reaching result. Among their students we now recognize some of our outstanding doctors, lawyers, scientists, artists, successful businessmen, poets, writers, musicians, and actors.

Ford Awards Spur Workmanship

A comparatively recent movement concerning our school shop activities is beginning to have a very marked effect on developing a reverence for skill on the part of the general public and the parents of our children. I refer to the Ford Motor Company's Industrial Arts Award program. I have seen these annual exhibits, and each year I notice a step-up in the quality of design and workmanship of the projects submitted in competition for these awards.

On August 24, 1951, Herb Graffis of the *Chicago Sun-Times* made this timely statement: "The older businessman who is bellyaching about youngsters wanting to coast along without work or ambition should take a treatment by going out to our Museum of Science and Industry the next couple of weeks. He should look at the best of 2500 exhibits that high school lads and lasses made for the Industrial Arts Awards, annually presented by the Ford Motor Company. It will astonish any businessman to see the excellence of these kids' achievements in wrought metal, patternmaking, machine-shop work, molding, plastics, electrical equipment, mechanical and architectural drawing, and printing. . . ."

In referring to a local boy who won one of the outstanding prizes, Graffis says: "When Joe gets out of high school, he told me at lunch, he wants to be a mechanical draftsman. If you need a smart sound kid for this work, keep your eye on Joe. His dad is a machinist with the Sunbeam Electric Company; his brother, Jerry, is a machinist with the Wire Sales Corporation. Joe says they are both top masters at their work, and have inspired him. So he is determined to be a success in *his* field of American industry. Talking with this quiet, earnest representative of American

youth whose work shines in that industrial arts exhibit is a sure cure for any sour-pussed old businessman who bellyaches about what happens to kids today."

I hope that some day the Ford Motor Company will recognize the tremendous social value of this exhibit and be willing to stand the expense of creating a sort of freedom train to take it across the country. It would have an immense effect on every community that saw it.

This exhibit is a real challenge to every teacher of industrial arts and vocational education. All boys do not have a flair for handling tools and machines, but all can appreciate good work and gain recognition for doing the best they can. To inspire an average boy to do his best is not always an easy task. *But it is the everlasting challenge of the teacher to discover some form of work where the boy will find himself by the old process of losing himself in a self-directed activity which makes for skill, knowledge, and good work attitudes.*

Repetition of uninteresting tasks has no place in our industrial-arts shop. Furthermore, we cannot afford to let sloppy work go unchallenged. We must never fail to praise all the little things that are done well. A teacher's praise is one of the greatest incentives to reaching goals that appear beyond a student's grasp.

Learning During Leisure

We are fortunate that there are other forces at work stemming from our school shops for developing this reverence for skill. Amazing things are being done in such extracurricular activities as the Boy Scouts, the Future Farmers of America, the Future Homemakers of America, the New Farmers of America, the various model-building associations covering aircraft, automobiles, yachts, railroad; and also the various labor union awards that are given to apprentices. All of these make me very hopeful about the future of America. It is amazing to observe the amount of technical knowledge that members of these various associations have developed out of books and by research experiments going on in basements and club houses.

As long as we have good teachers in our school shops, who are also taking an active part in the work of such extracurricular organizations, I do not worry over headlines telling about the apparent moral lapses among our young people, even though I do get a little frightened when I think of what has happened in the field of sports. I do not think that any of the boys who won the Special Achievement Awards in the Ford Industrial Arts competition are going to be tempted by the dirty pieces of silver from a gambler's bag; this type of outstanding skill will help them make money the *honest* way.

We need a more serious interest on the part of parents in what the boy is doing in the school shop. Parents and school authorities ought to give unstinted praise and encouragement to this type of work, because this is the kind of activity most of our children will eventually find themselves in. We need more local exhibits showing the activity of our school shops. We need to invite parents and members of civic organizations to come and see. When they do, they will get a better understanding of what the school shop is supposed to do.

I feel there has been a wrong emphasis in looking at some of our school activities. This has led some parents and students to see the school as a sort of social club devoted to turning out glamour girls or athletes. Or they regard it as a place where the school authorities guarantee to make your child or mine a smarter or richer person.

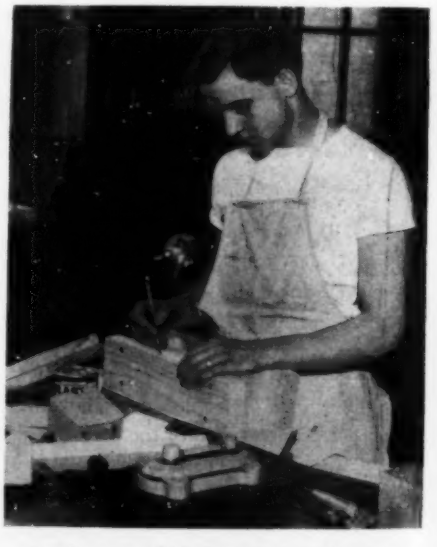
All education must be concerned with providing the right kind of learning situation which will enable young people to develop their native capacities to the fullest. Education must provide an equal opportunity for all to grow to mental maturity, for the purpose of doing the work of the world better than our forefathers did it.

Good Teacher-Trainers Impart Reverence for Skill

I would like now to direct my gospel of reverence for skill more directly to the teacher-training college. Here the good teacher becomes wedded to his job; he dedicates himself to the task of guaranteeing the highest quality of skillful teaching. He develops in his students a great reverence for his skill; he imparts to them a code of ethics in their work. He brings his students to believe in these things implicitly. Thus in turn the students — the young teachers of tomorrow — absorb the same spirit of dedication to the ideals of good teaching. They come to realize that *they* must not let down in these endeavors to influence *their* students in the proper ways of work and life.

Reverence for skill — particularly that of the master teacher's skill — is something that you do not get completely out of a book or from lectures or from any system of self-check examinations. *It is something of the spirit.* It is absorbed from another person and becomes a part of you in the same way that you get energy from the oxygen you breathe. It comes from the ability to strike a responsive fire in your student. It must be kindled by your own enthusiasm, imagination, and personality. Without this, your teaching will remain lifeless, even though it is based on an inspired theory.

When young teachers leave your training institution, they shoulder a great responsibility. In some ways an apprentice teacher may be ill-prepared to teach when he goes to his own school shop. For one thing, industrial arts does not have the established, definite, fixed subject-matter of mathematics, English, or geography. If he goes into a big-city system, he may be placed in a teaching position which demands skills in a craft in which he has only a limited experience. Or he may find himself in a small town where he has the complete responsibility for establishing a program without much help and without the kind of equipment he had in the



Student working on a core box in the patternmaking department of the Milwaukee Vocational and Adult Schools

— Photo submitted by Stanley O. Opsahl, teacher of photography

teacher-training institution. I do not think it is possible in a four-year program to give a thorough training in a large number of specific crafts together with supplementary technical related knowledge that belongs to the craft and the necessary theory and practice of teaching.

Experience First, Theory Later

I feel it would help the total training program if the student teacher came to the school with a professional skill in some recognized craft. Perhaps we spend too much time on the theory of education and educational methods in those beginning years. Perhaps some of this material would be better digested if it came later when the teacher had some teaching experience. I know that the members of the engineering staffs in a university often wonder just what is taught in a school of education.

I recall being asked such questions as: "Do you really have enough content to keep people busy during the number of hours you spend on this thing you call educational method and theory? Do teachers really put that stuff into practice?"

The real difficulty about the problems of educational method and theory is their effervescent quality. In any teacher's lifetime, three or four theories may be developed with signs of becoming the final answer to this question of what and how to teach. And then these theories go through the stages of birth, growth, degeneration, decay, and death in a few years.

Often what is recognized as a step forward consists only of a skillfully argued opinion rather than tested experience. Often such opinion results in putting real insight out of action for a long time. "Skipper" Charles Allen had a direct approach to the whole problem of teaching a vocational skill. The principles which he and his staff developed at Newport News in World War I could have been squeezed into a 100-page pamphlet. Later he developed his presentation into a full-sized book, and I am not sure he made it plainer by this effort. During World War II some bright fellows condensed these principles onto a 3 by 2 card. (Of course, it is not that simple.)

Every successful teacher knows that the basis of his success lies in the continued, careful, never ending preparation for every lesson given. The plan of preparation need not slavishly follow any pattern, either. Very seldom can we prepare educational soup that is hot and nourishing if we merely use a quick warmover procedure. We are compelled by the changing situation of every class to add new ingredients to the brew.

What About Graduate Work?

Sometimes I get a little concerned about a student's reason for taking graduate work. Is it to get more dollars, or more power?

How many teachers are taking graduate work in the subject they are teaching? How many shop teachers are taking graduate work in research and administration? How many of these teachers have all the qualifications for this type of work? How many jobs are there open in this kind of work? How many football and basketball coaches with industrial arts as a sideline are taking graduate courses in industrial arts in order to reach some high school salary requirement covering a degree?

I often wonder how many of the G.I.'s now enrolled for physical education as a main dish and industrial arts as a dessert will later plague the graduate school in industrial arts for advanced degrees. Is there a danger that our graduate's thinking may be colored by the thought that his studies are a sort of Educational Christmas Savings Bank where you watch your credit grow? Is there a danger in the possibility of some bright boy's obtaining a B.A. and then slipping on to the coveted M.A. or Ph.D. with limited teaching experience in industrial arts or vocational education?

The graduate schools should offer courses in subject matter designed not only to produce research workers and administrators but also to broaden the knowledge and skills of the teacher. I see no reason for not giving educational credit to teachers who get together for a period of three or four weeks to sweat out the details of a new project or a new course of study under the supervision of the State Department. The experience has real practical value and will add much to the teaching skill of those who participate in the activity. I know this is being done in some states, but I do not believe it is a general practice to grant credit for the work. I also like the Michigan Co-operative Plan. This new angle of vocational teacher-training should be watched with interest.

Promoting mental maturity should be a first consideration of a graduate school. The skills of speaking and writing plainly could be part of this training. I would also favor subject matter on an engineering level to enrich the teacher's technical background. Then there is the whole field of social science and the psychology of work relations, and the field of ethics which stems from everlasting devotion to working for an increase in the practice, knowledge, and love of what is right. I would also urge a serious study of the unique features of our great Republic with its resounding freedoms and with its compulsions such as public education and public health. Furthermore, there is the great field of the arts which adds beauty to our structures. All of these subjects are, from my point of view, material for the industrial arts teacher who is taking graduate work.

Thinking for Ourselves

I sense a tendency in the educational thought of our times to induce the individual teacher not to arrive at his own convictions by his own thinking, but to make his convictions the same as those that come ready-made.

I know that when the teacher is on his own in front of his class, he soon realizes that he has to meet with an ever changing situation. He has to change his pace and method of attack like a good open field runner on a football field. If he is well trained, if he has had extended field practice in meeting such situations, if he loves his work, if he is sincere, I believe he will solve his problems by his own thinking.

A young teacher must have some definite ethical concepts to guide his general conduct and his relationship with his class, with his fellow teachers, and with his community. It is, therefore, a direct obligation of the teacher-training institution to make young teachers morally better by accepting the challenge of a steadfast respect for the truth; for a simple sincerity in the inherent worth of all students; a love and reverence for the skills and knowledge of his profession; and a sincere desire that in all his relations with his students he will strive to bring out the best in his students. These are moral virtues which have the natural reaction of bringing out the best in the person who puts them into practice.

I am deeply appreciative of the tre-

mendous contribution that the men of this group have made for the cause of industrial arts and vocational education. Your field of activity has been accepted by all educators; you have made real contributions to the literature of your field. We have come a long way since 1900, and the most interesting thing about our profession is the everlasting challenge of youth for an adequate preparation for living. My only purpose in throwing some questions into the pot of our thinking lies in the fear of our becoming static and unwilling to meet the problems of the changing times in which we live.

It is fortunate that *all* master teachers are not in the great institutions of learning, even though many are found there. It is a matter of first importance that the teachers in a training college covering industrial arts or vocational education should be masters of some specific craft.

Equally important for the student, however, is to sit at the feet of a master teacher of his other studies — to share the thrill of the experience of seeing this teacher develop an idea and open the doors of the minds of his students to receive it. As he opens these doors, note his sincerity, his order of progression in the development of the subject, his handling of the complexity of the new principles which are developed at every step — and all to the end of challenging the student *to think.*

I am not too worried about the things that a student will forget in terms of theoretical knowledge in his experience at a college or university, if I have the assurance that he takes with him the imprint on his personality of a number of men who have taken his immature concept of a teacher's job and placed it on a pedestal that he never can quite reach.

If he has learned to work skillfully with tools and machines, if he has learned to feel joy in working with young people and has been accepted by them as a guide and counselor, if he has served an apprenticeship in teaching for a year or more under a master teacher covering the skills of how to teach the subject, I do not worry too much about this new teacher meeting the challenge of his job.

Work Is Love Made Visible

As a fitting close to what I have said, I would like to quote from the *Principles of Vocational Education,* written by my good friend, Dr. Franklin J. Keller. Since his book is not an American Technical Society publication, I will be pardoned for the plug I make for his excellent text. The portion that I am about to quote is from a sort of prologue to the book, and expresses more adequately than I can my gospel of work. It is taken from "The Prophet," by Kahlil Gibran:

"Then a plowman said: 'Speak to us of work,' and he answered saying: . . . Always you have been told that work is a curse and a labor of misfortune. But I say to you, when you work, you fulfill the part of earth's dream assigned to you when that dream was born.

" '. . . All knowledge is vain save when there is work, and all work is empty save where there is love.' Often I have heard you say as if speaking in sleep: 'He who works in marble and finds the shape of his own soul in stone is nobler than he who plows the soil.

" 'And he who seizes the rainbow to lay on a plaque in the likeness of man is more than he who makes the sandals for our feet, but I say not in sleep but in over-wakefulness of noontide that the winds speak not more sweetly to the giant oaks than to the least of all the blades of grass.

" 'And he alone is great who turns the voice of the wind into a song that is sweeter by his own loving.

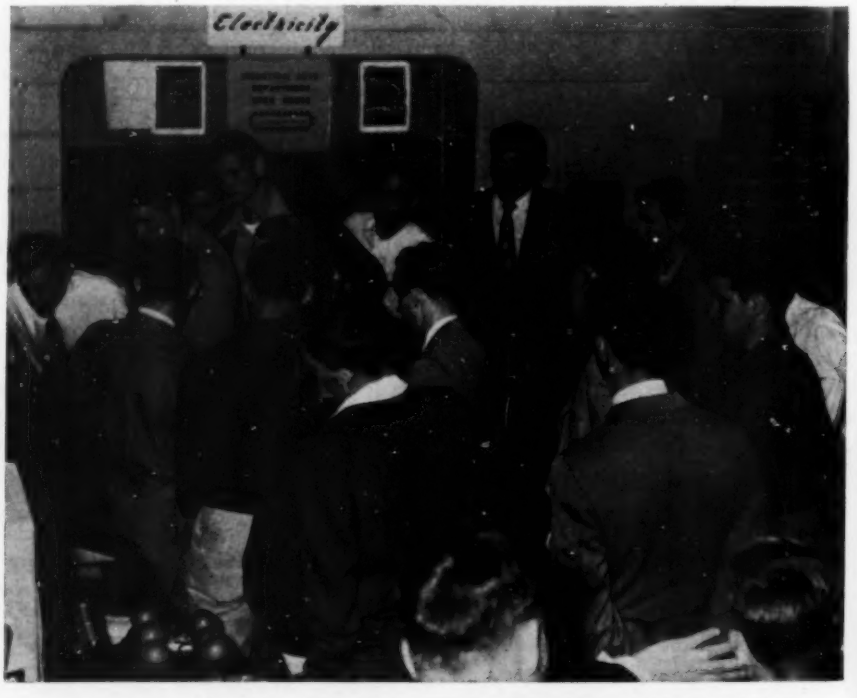
" '*Work is love made visible.*

" 'And if you cannot work with love, but only with distaste, it is better that you should leave your work, and sit at the gate of the temple and beg alms of those who work with joy. For if you bake bread with indifference, you bake a bitter bread that feeds but half man's hunger. And if you grudge the crushing of the grapes, your grudge distills a poison to the wine.

" 'And if you sing though as angels and love not the singing, you muffle men's ears to the voices of the day and the voices of the night.' "

The work of the teacher is based on a love for young people. His profession is one of the greatest, as it is concerned with the development of young minds and the formation of character in the most important stage of mental growth.

The young teacher should enter his profession with the spirit of a disciple dedicated to a cause. He will find great happiness and success in his chosen field in proportion to his skill to impart what has been taught, and to his ability to grow in wisdom on the job.



Scene in the electrical shop at the open house held on high school day, April 19, 1951, at the North Carolina State College, Raleigh, N. C.

—Submitted by Warren L. Carter, graduate student

Leaders in Industrial Education

WILLIAM T. BAWDEN
Emeritus Professor
Kansas State Teachers College
Pittsburg, Kans.

(*Continued from page 10 of the January, 1952, issue*)

GEORGE EDMUND MYERS

There are special reasons for personal satisfaction in writing about the subject of this sketch, for our paths crossed under unusual circumstances in widely separated parts of the country, although neither of us was aware of the juxtaposition until years later. First, he served five years as principal of a technical high school in Washington, D. C., where, four years later, I was appointed to the staff of the U. S. Bureau of Education. Next, he served as second principal of the State Manual Training Normal School of Pittsburg, Kans., now the Kansas State Teachers College, where, 22 years later, I was appointed head of the department of industrial education.

Our first meeting was at the U. S. Bureau of Education, now Office of Education, in Washington, in the late fall of 1914. Dr. Myers had recently returned from a year of study and investigation in Europe, and called to inquire whether the Bureau would be interested in publishing the report of a study of a number of vocational schools, particularly German schools. I was too new at my job to know how such matters were handled, but we had a conference with the editor-in-chief of the Bureau publications, at which we both received some helpful suggestions on the kinds of material the Bureau might be interested in publishing. We learned also that the Bureau had not at that time published a report of an investigation such as Dr. Myers had made. We then had an interview with Dr. Claxton, Commissioner of Education, at which tentative plans and commitments were agreed upon, and the report was subsequently published as a Bulletin. During the years since 1914, we have had numerous personal contacts, as will appear hereafter.

Education

George Edmund Myers was born at Massillon, Iowa, on November 26, 1871, and is a graduate of Ottawa University, Ottawa, Kans., with the A.B. degree in 1896. Incidentally, this is the same year in which I received my A.B. degree from Denison University, Granville, Ohio. Myers enrolled for graduate work in mathematics at the University of Chicago, where he was awarded the A.M. degree in 1901; and at Clark University, Worcester, Mass., Ph.D. degree, 1906. He also completed one year of postdoctoral study at Teachers College, Columbia University, New York, in 1914–15.

His teaching experience began in Muskogee, Okla., where he was a teacher of history in Bacone Indian School for three years, 1896–99. He served for three years, 1901–04, in the senior high school, Colorado Springs, Colo., one and one-half years as teacher of mathematics, and the same length of time as principal. For five years, 1906–11, he was principal of the McKinley Manual Training High School, in Washington, D. C.

George Edmund Myers

In September, 1911, he was appointed the second principal of the State Manual Training Normal School of Pittsburg, Kans., now Kansas State Teachers College, and left in August, 1913. A political upheaval in Kansas brought about the abolition of the board of regents and the appointment of a new board which demanded the resignations of the heads of the three State Normal Schools.

The year, 1913–14, was spent in a study of vocational schools in Europe, and during the following three years, 1914–17, Myers was supervisor of continuation classes in the public schools of New York City.

In the fall of 1917, he was appointed professor of vocational education and guidance at the University of Michigan, Ann Arbor, which position he held up to the time of his retirement,

in February, 1942. Since that date he has made his home in Ann Arbor.

Supplementary Activities

In addition to his regular duties, as indicated, he served as lecturer in the department of education, George Washington University, Washington, D. C., from 1907 to 1910. Also, he was guest professor in the summer sessions at the State University of Indiana, Bloomington, 1915; New York University, New York City, 1917; University of California, Berkeley, 1928; and the University of Colorado, Boulder, 1942.

His contributions to the progress of industrial arts, vocational education, and guidance in his adopted state of Michigan were especially noteworthy. Through the co-operation of the Michigan State Department of Education, the University of Michigan, and the local boards of education, Dr. Myers served as director of a series of vocational education surveys: Grand Rapids, 1919; Detroit, 1920; Flint, 1922; Kalamazoo, 1924 and 1936. Also, he was a member of the commission that conducted the state survey of technical and higher education in Massachusetts, in 1923.

The Kansas Episode

Elsewhere I have written in a somewhat different vein concerning Dr. Myers' term of service as principal of the State Manual Training Normal School of Pittsburg, Kans.[1] It is sufficient for the purposes of this narrative to recall that the Manual Training Normal School was established, in 1903, as an "Auxiliary" or "Branch" of the older and well-established State Normal School of Emporia. The same was true of the State Normal School of Hays, which opened in 1901. This relationship did not prove satisfactory, and friends began agitating for separation, and independent status for the Pittsburgh school. The founder and first principal of the school, R. S. Russ, was forced out in 1911, because of his activity in this movement, and Dr. Myers was appointed, with the definite understanding that the "Branch" status of the Pittsburg school was to continue.

Before going to Pittsburg Dr. Myers knew very little of the nature of the controversy among the three schools, and nothing of the intensity of the feeling that had developed in Pittsburg, not only among faculty and students but in the community. The conditions of his appointment left him no alternative to support of the policies of the board of regents. The necessity for this stand seems not to have been understood by some of his colleagues in the faculty, and some of the leading citizens of the community, who were determined upon separation from the *parent* school in Emporia. Consequently, Dr. Myers was never really forgiven for his refusal to join forces with those who decided to challenge the authority of the board of regents, and to precipitate the issue of separation. After two years of maneuver, discord, and frustration, the struggle for independence was finally won, in 1913. A new governor was elected, who promptly appointed a new board committed to the policy of separating the institutions.

One of the measures adopted to put an end to the controversy, and to promote peace and harmony, was the decision to appoint new heads for all three Normal Schools. And so, Dr. Myers had to leave. The achievements of his subsequent career suggest something of the service he might have rendered to the struggling young Kansas State Manual Training Normal School if he had been given the opportunity.

[1]Bawden, *The Struggle for Independence and the Administration of George E. Myers.* Chapter VI, *A History of Kansas State Teachers College, 1903–1941.* To be published by the College, probably in January, 1952.

Control of Vocational Education

The following year, 1913–14, Dr. Myers spent in a study of vocational schools in Europe, principally in Germany, the report of which was published as a Bulletin of the U. S. Bureau of Education, as previously noted.[2] This report came out at a time when there was much public discussion of and controversy over the respective merits of the "unit versus dual control" systems for the administration of vocational education.

In order to make clear the full significance of Dr. Myers' report, it seems necessary to digress at this point, and to review the background of this controversy concerning the administrative control of vocational education. This was an important episode in the history of vocational education in the United States.

Massachusetts originally provided for the establishment of a system of "independent" industrial schools, in 1906, and the administration of the program by an Industrial Education Commission independent of the State Board of Education. This arrangement was terminated in 1909, by a revision of the law which abolished the independent commission, and transferred the administration of vocational education to a reorganized State Board of Education. Most of the other states, in time, adopted the policy of lodging the control of vocational education in the same board or department that was responsible for the regular public schools. In Kansas and a few other states, a State Board for Vocational Education was provided for in the law, but its personnel was identical with that of the State Board of Education. The most common form or organization was a

[2]George E. Myers, *Problems of Vocational Education in Germany.* Bulletin, 1915, No. 33. U. S. Bureau of Education, Government Printing Office, Washington, D. C., paper, 46 pp.

Arts and crafts products made by students of Tucson Senior High School, Tucson, Ariz. Submitted by Harry A. Goldstein, instructor of photography

— Photograph by Ken Kemmeries

section or division of vocational education in the State Department of Public Instruction.

When the Smith-Hughes Federal Vocational Education law was enacted, in 1917, each state was required, upon accepting the provisions of the law, to designate a state board of at least three members. It was provided that this board might be the existing state board of education, any other board having charge of the administration of public education or of any kind of vocational education, or an entirely new board created for the purpose. By the close of 1918 it was reported that, "of the 48 states, 35 have designated the state board of education or the state department of public instruction; eleven have designated a state board for vocational education or industrial education; one a state board of agriculture; and one a state high school board."[3]

"Of all the laws passed in the states west of New York, none in the period under discussion were as complete as those enacted by the state of Wisconsin up to and including 1911; none were as much quoted and discussed."[4] Adopting the policy of separate control, the Wisconsin Act of 1911 provided for a State Board of Industrial Education consisting of nine members. Of these, three were *ex officio* members: the state superintendent of public instruction, the dean of the extension department and the dean of the college of engineering of the University of Wisconsin. Six members were to be appointed by the governor, three employers of labor, and three skilled employees.

The law provided that, in any community of 5000 population or over, a local board of industrial education might be appointed, by the "regular" board of education. The superintendent of public schools was to be, *ex officio,* chairman of the board, and two employers and two employees were to be appointed. "This law gave to Wisconsin a system of vocational education that could not be destroyed by the opposition of academic-minded schoolmen, and one that gave employees equal place with employers on controlling boards." The board in each city was vested with authority to levy a tax for the support of the vocational education program, and complete control of its operations. Although this plan has been followed with great success in Wisconsin, it did not make much headway in other states.

(To be continued)

[3]Bawden, *Vocational Education.* From the *Biennial Survey of Education in the United States, 1916–1918.* Bulletin, 1919, No. 25. U. S. Bureau of Education, Government Printing Office, Washington, D. C.

[4]Charles A. Bennett, *History of Manual and Industrial Education, 1870 to 1917* (Peoria, Ill.: The Manual Arts Press, 1937), p. 540.

Television in Education

NORMAN C. PENDERED
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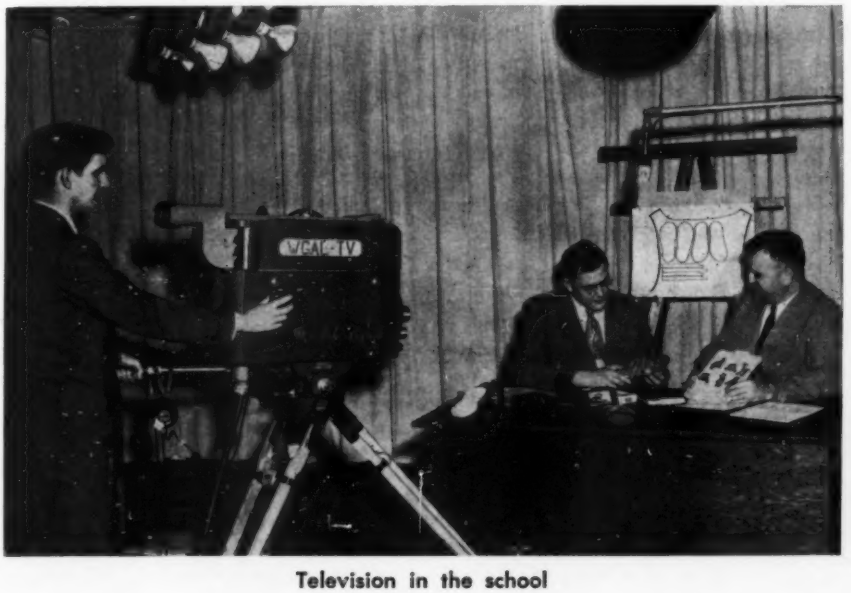
State Teachers College
Millersville, Pa.

The industrial-arts department of the Millersville State Teachers College is continuing to present television programs regularly over WGAL-TV (Channel 4, Lancaster, Pa.). The current series of programs is entitled "M.S.T.C. Presents." In general the industrial-arts programs seek to illustrate and to demonstrate selected phases of handwork in an interesting and entertaining manner. The programs strive to be both educational as well as entertaining. Programs are also presented by other departments of the college.

The accompanying picture of a recent program shows, from left to right, Nelson Sears of the broadcasting station at the TV camera, Professor Norman C. Pendered, demonstrating leatherworking, and Professor George R. Anderson of the mathematics department acting as television guide and program director. This particular program featured a timely subject, "Leather Gifts for Christmas." The making of personalized gifts of leather was demonstrated with the expressed thought that listeners would make some of their own gifts. An innovation was the preparation of a leather booklet to supplement the program. It was offered free to listeners and contained pertinent facts about leather, lists of leather suppliers, instructional references, and other information as well as complete illustrated directions for making one of the leather projects demonstrated on the program. The booklet was designed to test listener response which was so encouraging that



Television in the school

a revised edition of the booklet was prepared.

Plans for future programs to be presented by students and faculty of the industrial-arts department include "Electric Motors," "Internal Carving of Plastics," "Bookbinding," "Pottery Making," and "Weaving."

So far, educators as a whole have seemed reluctant to accept television either as a means of education or as an instrument with which to build and maintain good public relations. As a public relations tool, television is probably unequaled in potential influence and coverage. The full influence of television programs on the public probably never can be measured entirely, but the effect is known to be tremendous and far reaching. The reader may become more cognizant of the potentialities of television in education by considering the following statements. Paul Rodenhauser, producer at WGAL-TV, estimates conservatively that his station serves at the present time more than 55,000 TV sets. Since usually more than one person in a family observes a television program, the potential audience for this particular television may be expected to be in excess of 150,000 persons. Further, the station manager estimates that if only one per cent of the television sets in this service area were tuned in for a particular program, the video audience would be possibly 15,000 or more persons. And, these figures are for only one TV station in a small eastern city; the coverage increases proportionately with the density of the population of the area. The possibilities and implications for education become apparent at once. The children in our schools are doubtless our first means to build good public relations; our second means is through the parents and other adults in the community. Television is one vehicle which reaches both groups at one time. If our schools are to be modern, we must use modern means to inform the public of our work. Needless to state, the opportunity in our field may be greater than in certain other branches of education for our areas are so broad in range and scope and so fascinating and intriguing in content. Our schools should use television as one means to keep the public informed. The way is clear, the opportunity is at hand — the rest is up to us.

Home Mechanics Forms

VINCENT WILLIAMS
Home Mechanics Teacher
Lafayette Junior High School
Los Angeles, Calif.

The successful implementation of a course in home mechanics requires, among other things, the presentation of material that will meet the needs of students in a practical and not theoretical fashion. This is very necessary since there is a wide diversity of activities that may qualify as home mechanics subject matter. Failure to scrupulously select learning units pertinent to the immediate needs of the community may lead to disappointment on the parts of both teacher and students.

In an endeavor to determine the needs of his classes, the writer undertook a very modest survey. A *Home Repair Survey* form was prepared and distributed to students, who took it home and, with the assistance of their parents, completed and returned it to the teacher.

The form in question not only afforded the instructor some insight into the needs of his classes, but served as an effective agent for better public relations.

A second form, the *Home Repair Job*, was prepared as a sort of follow-up to the survey form. Information derived from the latter aided both the teacher and students in agreeing upon a repair job that could be done at home.

After instruction had been given that was pertinent to a needed home repair job, a student was given a *Home Repair Job* form to take home. Again, to better public relations, parents were offered an opportunity to participate, this time as graders. Later, after the form had been returned to the instructor, a final grade was given.

Home Repair Survey

A. Place a check mark beside any of the following items that you believe needs attention in your home:

Faulty light switches
Leaking faucets
Torn window screens
Fuses that blow out quite frequently
Leaking garden hose
Broken window panes
Doors that stick
Creaking floors
Worn-out linoleum
Broken plaster
Windows that won't stay up
Smoking flames on stoves and heaters
Doorbells that won't work
Clogged drains
Broken appliance cords
Dripping faucets
Broken chairs or small tables
Broken sidewalk
Electrical appliances that won't work
Bare electrical wire anywhere
Loose kitchen tile
Leaking toilet
Loose putty around windows
Door latches that won't catch

B. Now list below any other trouble that you are having with things around the house.

Home Repair Job

Description of repair job.....
Date started..... Date completed.....
Hours.....

(Items which follow are to be filled in by a parent.)

This is to certify that I have checked the repair job described herein, and I would rate it as being one of the following:

....Excellent ....Good ....Fair ....Poor
....I would like to have the job checked by the instructor.
....Instructor need not check this job.

Signed .....
Relationship .....

Home Repair Job

Description of repair job.....
Date started..... Date completed.....
Hours.....

(Items which follow are to be filled in by a parent.)

This is to certify that I have checked the repair job described above, and I would rate it as being one of the following:

....Excellent ....Good ....Fair ....Poor
....I would like to have the job checked by the instructor.
....Instructor need not check this job.

Signed .....
Relationship .....

Industrial Arts and Vocational Education

John J. Metz, *Editor*

SAFE DRIVING

The inventiveness of American industry has again achieved a victory even though it is a sorry victory indeed. It took 176 years of intermittent warfare before the millionth United States military death could be chronicled but the automobile had to give thoughtless and careless auto drivers power and speed enough to approach the sad record of war closely, but in a much shorter time.

If dates will make this bit of gruesome news more realistic, the military deaths are figured from the fall of the first Minute Man in the Battle of Lexington on April 19, 1775, while the automobile slaughter is reckoned from the early years of our century. This means that the automobile did in 52 years what it took a number of bloody wars to do in a space of 176 years.

The figures quoted in this editorial were taken from a study of war and traffic deaths made by the Association of Casualty and Surety Companies.

From the start of the Korean war on June 25, 1950, to August 31, 1951, a total of 13,707 United States soldiers had lost their lives according to the Defense Department records. During the first 63 weeks of the Korean war more than 44,000 men, women, and children were killed in automobile accidents.

At the start of the Korean war, there was a difference of 42,000 between the all-time totals of war and traffic deaths. At that time highway fatalities had reached a total of 944,000, but in 14½ months this difference was whittled down to approximately 12,000, because deaths from automobile accidents were increasing.

Between the months of July and December in 1950, 1870 more fatalities occurred than in the last six months of the year 1949. This points out definitely that the winter months bring about an increase in automobile accidents, and that drivers must be educated to drive with greater caution during this period.

The Association of Casualty and Surety Companies point out 23,500 out of 35,000 traffic deaths in our country were caused by speeding, drinking and driving, driving on the wrong side of the road, and failure to give right of way at intersections to pedestrians or other vehicles, or failing to observe "stop" signs. It has been ascertained that about nine out of ten automobile deaths are caused by drivers violating traffic laws.

More emphasis on safe driving education can do much to improve habits and attitudes of these careless motorists. Starting the safe driving education in high school will help boys and girls make the United States a much safer place to drive and live in.

THAT QUESTION OF ACCREDITATION

At present one hears considerable discussion on the topic "Accreditation of Industrial Arts Teacher Education" wherever those interested in the education of industrial arts and vocational education teachers congregate.

As one listens to these discussions one becomes quite conscious that there are several sides to the story but also that some people are not as informed on the subject as they ought to be. It is with great pleasure, therefore, that INDUSTRIAL ARTS AND VOCATIONAL EDUCATION presents on page 35 of this issue, Dr. Verne C. Fryklund's address which he gave at the 1951 A.V.A. convention at Minneapolis. It contains a very thoughtful analysis of the subject and should be carefully studied by all interested in the education of industrial-arts teachers.

SCHOLARSHIPS FOR YOU AND YOUR STUDENTS

"Born thirty years too soon" is a saying known to most of our readers. When one hears of the numerous scholarships that are available to students now enrolled in colleges, universities, and graduate and professional schools of the United States, many of the older teachers of industrial arts and vocational education will concede that they can truthfully apply the saying to themselves. How many of them would gladly have taken advantage of securing some of the scholarships now available, when they were working hard to amass the wherewithal to attend college in their younger days.

Earl James McGrath, U. S. Commissioner of Education, announces that about one in every 20 students now enrolled in the colleges, universities, and graduate and professional schools of our country can get such a scholarship or a fellowship ranging in value from less than ten dollars to the complete cost of a college education.

The commissioner expresses great satisfaction that institutions of higher education are providing 125 thousand undergraduate scholarships valued at 27 million dollars, and 14 thousand graduate fellowships totaling 9¼ million dollars.

This kind of assistance is a great boon to students, who without such aid, may be unable to complete their higher education because of lack of money. Of course, there are specific requirements that limit the eligibility for securing some of these scholarships. There is one that is available only to the descendant of a Confederate soldier. Another is open to the descendant of an Alaskan pioneer. Then there is one for a needy farm boy, a physically handicapped person, a former caddy, a scout, and a newsboy. Others are for children of faculty members, of military personnel, or of members of fraternal organizations.

Nearly 18,000 scholarships and 9000 fellowships are designated for certain subject-matter fields. The 10 fields in which the largest number of scholarships are reported are: music, 3183; engineering, including aeronautical, chemical, civil, electrical, mechanical, and general, 3661; agriculture (general), 2633; education, 2082; home economics, 740; theology, 646; medicine, 575; religious education and Bible, 478; fine arts, 460; and law, 414. The five ranking fields for fellowships are: theology, 1361; chemistry, 793; medicine, 785; engineering (all branches), 724; and law, 548.

With such a wealth of scholarships available, shop teachers can be of great assistance in advising and giving information about these opportunities to their students. Undoubtedly some of these scholarships also can be made available in teacher training institutions and in this way help teachers in the field acquire advanced degrees.

Information about these scholarships can be obtained from the Superintendent of Documents, Washington 25, D. C., by ordering the Office of Education publication, "Scholarships and Fellowships Available at Institutions of Higher Education." The price is 55 cents.

An Arts Reference Laboratory for Secondary Schools

CLYDE E. BURNS
Director of Industrial-Arts Education
Florida State University
Tallahassee, Fla.

A school system tends to reflect the society which provides educational opportunities for its citizens. An era of specialization has been reflected in the public schools as subject matter areas have been emphasized and skills in single materials have replaced comprehensive abilities in the arts. As a result of this trend, art, industrial arts, arts and crafts, and art education have been carefully separated into categories of experience unrelated or only loosely related. A further regrettable separation is the removal of those activities and experiences from the learning situations arising in subject matter areas where such arts experiences may serve to enrich and make more meaningful the so-called subject matter. Recently industry and business have come to recognize the need for individuals with a comprehensive understanding of the industrial and business scene plus minor areas of specialization. This concept is slowly being reflected in the public schools and should be encouraged because of the values which accrue to the individual.

In order to implement this broadened concept of education with special reference to art and industrial arts, the writer would suggest a plan, which for lack of a better title may be called an *"arts reference laboratory."* Under such a program the laboratory will serve the same function for the entire secondary school program as the school library does now. Since the function of a library is fairly well understood, the analogy may facilitate an explanation of the arts reference laboratory. The use of a library is made possible through the development of basic reading skills and some direction in the use of library facilities. The purpose of library use is to bring additional information to bear on problems. The facilities are open to all areas of the school but may be scheduled on special problems which require more than normal use of space and personnel. Similarly the arts reference laboratory will depend for its adequate functioning on the development during junior high school of basic skills with tools and an understanding of materials. The staff provided to give direction and instruction as needed in the working out of any problem must be experienced in the handling of many materials, and must possess broad experiences in the many phases of secondary education. A combination of personnel may be necessary to provide a good balance if the reference laboratory service to be rendered in adding meaning to investigations of problems or the development of ideas. An art teacher and industrial-arts teacher may work cooperatively in such a laboratory to provide the greatest potential resource aid for pupils. The reference laboratory will be open to all areas of the school on the same basis as the library is now, but special activities in an area may necessitate the scheduling of facilities for restricted use. With an arts reference laboratory in operation such school activities as production of stage settings, making of posters and displays, building of instructional models, and development of instructional materials can be carried on by students with the maximum of assistance and the minimum of duplication of facilities. Physical equipment will be housed in easily accessible space under a plan currently called the general shop or laboratory of industries. Specialized equipment may be grouped within the laboratory, but an open type of arrangement will be necessary for observation of activities and for freedom of movement from one activity to a related one. The problem to be solved, or a school-based project to be completed will determine materials and equipment to be employed.

In order for such a program to function there are several factors necessary. These are listed briefly in item form as follows:

A. The school philosophy must go beyond subject matter lines to a broadened concept of problems.

B. Laboratory space and facilities must be provided for comprehensive activities.

C. Personnel must be prepared for this type of work by varied experiences in industrial arts, art, and general subject matters areas.

D. Scheduling must be flexible to allow time for irregular use of arts reference laboratory and planning requisite to the program's functioning.

E. The entire school must see value in this type of expression and work cooperatively to use staff, materials, and facilities for the maximum development of the students.

The place of industrial arts in the junior high school has been rather well established on a broad basis of exploratory experiences in a variety of industrially based activities but the secondary school industrial-arts program lacks this general clarification. The dichotomy between vocational and general education has not been resolved to any satisfactory degree in many schools. It is hoped that the arts reference laboratory concept will provide a workable solution to this confusion of purpose and give meaning both to the industrial arts and to the expanded school program.

Although the United States has only 12 per cent of the world's land area geologically favorable for the occurrence of petroleum, American oil men have discovered about two thirds of all the oil found in the world to date.

* * *

You are almost three times as likely to be killed in an automobile accident between seven and eight in the evening as you are between seven and eight in the morning.

PROBLEMS AND PROJECTS

MOTOR DRIVEN POTTER'S WHEEL

EINO O. HAKALA

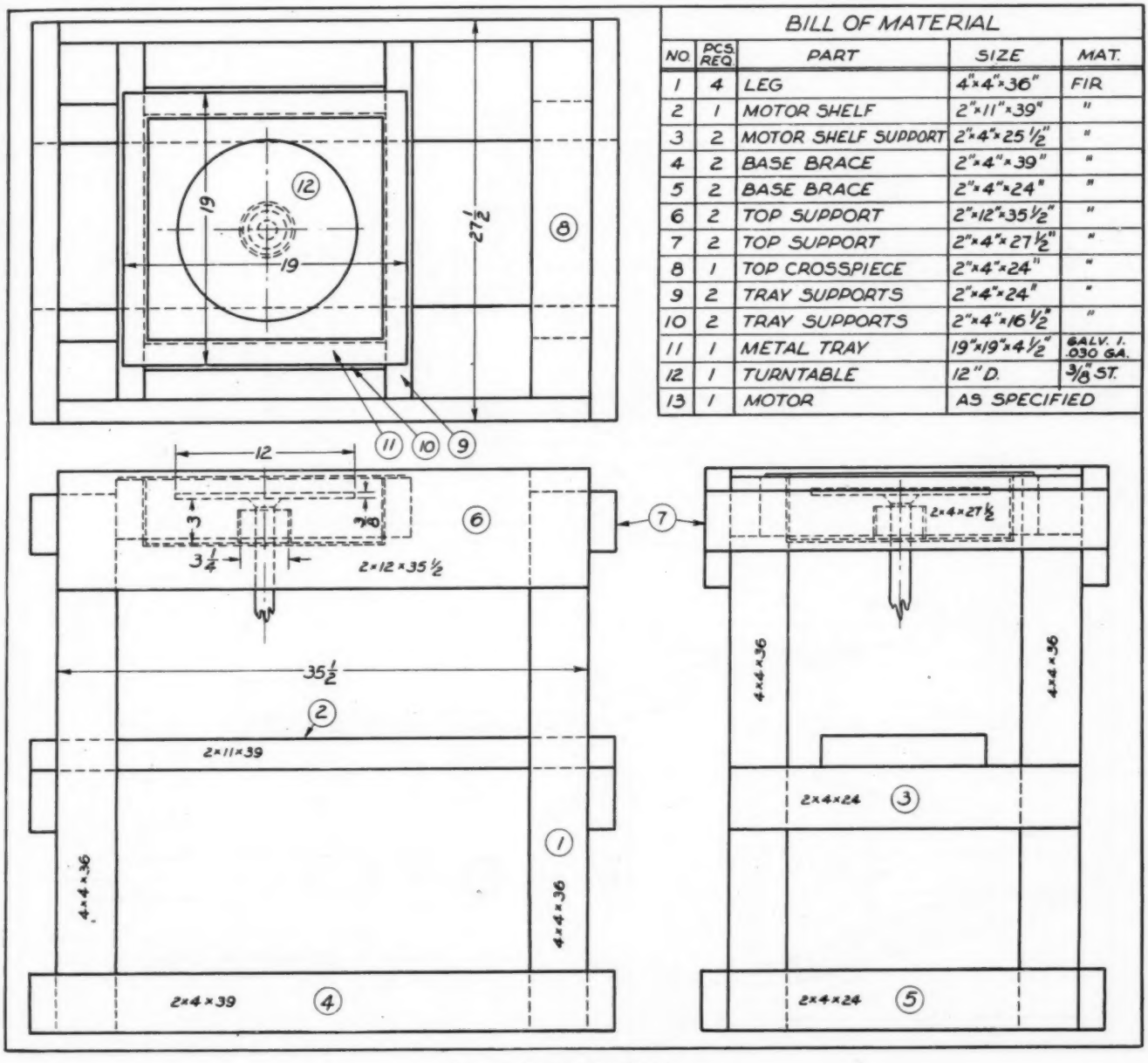
General Shop Instructor
Industrial Arts Department
Thomas Jefferson High School
San Antonio, Tex.

General shop teachers who are teaching ceramics will find this shop made potter's wheel less expensive than a kick wheel and much smoother in performance. It can easily be built by senior high school boys in the shop. The solid, heavy construction is essential to vibration-free operation. Harding Black, nationally known San Antonio ceramist, is the originator of this type of wheel, and uses it exclusively in his classes at Witte Museum.

All stock is standard dimension fir, No. 1 grade, and need only to be cut to length.

The motor unit is equipped with reduction gears so that the table turns at 96 r.p.m. It is a ¼ h.p., 115-volt, 60-cycle single phase motor. Speed 1725 r.p.m.

The turntable is made of steel, and if the school shop is not equipped to make it, any machine shop can produce it. Several coats of a good enamel are recommended to waterproof all wooden parts. The galvanized pan is removable, which greatly facilitates cleanup.



BILL OF MATERIAL

NO	PCS. REQ	PART	SIZE	MAT.
1	4	LEG	4"×4"×36"	FIR
2	1	MOTOR SHELF	2"×11"×39"	"
3	2	MOTOR SHELF SUPPORT	2"×4"×25½"	"
4	2	BASE BRACE	2"×4"×39"	"
5	2	BASE BRACE	2"×4"×24"	"
6	2	TOP SUPPORT	2"×12"×35½"	"
7	2	TOP SUPPORT	2"×4"×27½"	"
8	1	TOP CROSSPIECE	2"×4"×24"	"
9	2	TRAY SUPPORTS	2"×4"×24"	"
10	2	TRAY SUPPORTS	2"×4"×16½"	"
11	1	METAL TRAY	19"×19"×4½"	GALV. I. .030 GA.
12	1	TURNTABLE	12" D.	⅜" ST.
13	1	MOTOR	AS SPECIFIED	

Powered potter's wheel

CENTERING JIG

NORMAN BROOKS
Penn High School
Greenville, Pa.

Accurate centering of round steel rod or wood dowels in the machine shop is always a problem, but with the use of the centering jig shown, each operation becomes a near perfect step toward a better completed problem.

A piece of standard gauge 1½-in. black iron pipe is used for the "tube," and should be machined to the dimensions shown.

The cone is machined from a piece of 2-in. C.R.S. The outside need not be tapered but for a lighter and better tool this should be done. Sizes on the cone match those on the tube.

Any number of sleeves can be made to satisfy rods or dowels to be centered. Hole *D* in sleeve should be at least 1/32 in. larger than rod to be centered to allow for loose fit over material. This loose fit will in no way affect accurate centering.

The center punch should be made of tool steel as shown and tempered as desired with running fit in cone.

The tube is spot welded or tacked to cone and sleeves are held in the tube with three 3/16-in. Allen setscrews.

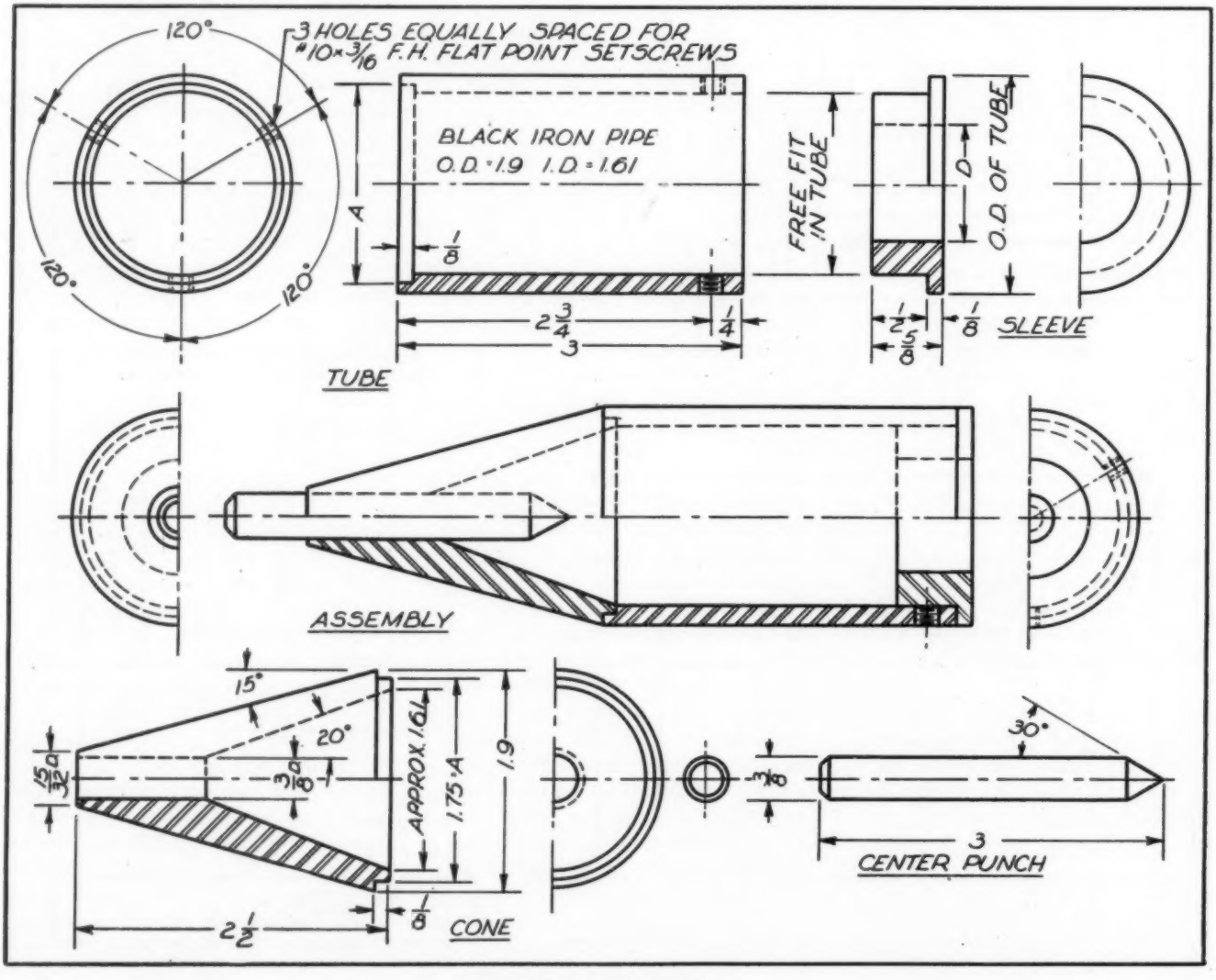
This tool should be used to mark center lightly, and then a regular center punch is used to mark it for drilling.

MODERN PROBLEMS FOR MECHANICAL DRAWING

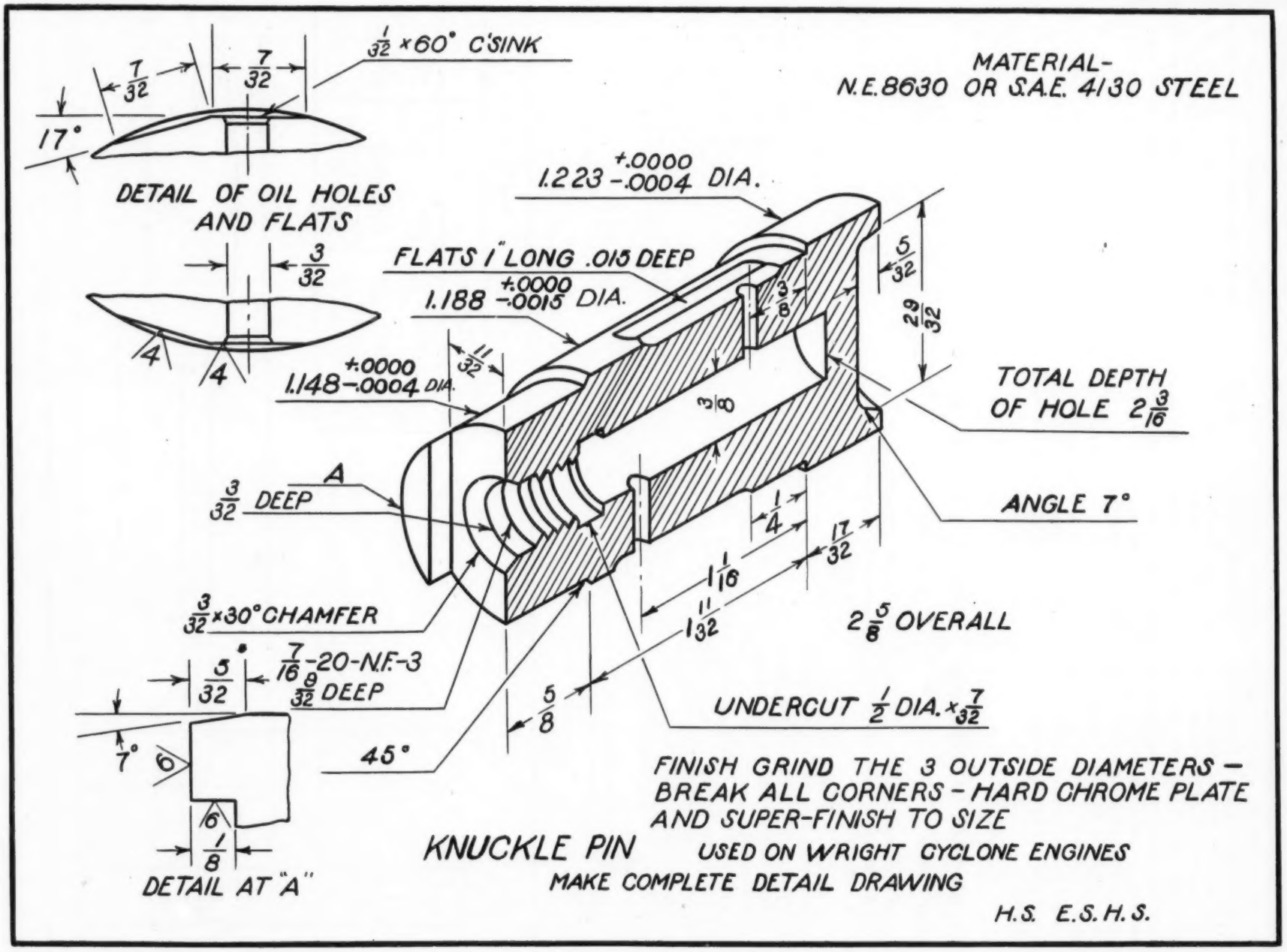
HOWARD G. STINTSMAN
East Side Commercial and Technical High School
Newark, N. J.

During the last war one of the pencil manufacturers co-operated with several producers of aircraft parts to select small parts that could be used as problems in mechanical drawing classes. These parts would be taken from planes that were actually in use at the time, and problem sheets for mechanical drawing classes were prepared from them. The interest on the part of the students was very stimulating. They felt that they were really drawing modern machine parts. Many of the problems that we as teachers use in our drawing courses are excellent from the teaching standpoint and they fulfill our aims, but when the student finds that the part comes from some obsolete machine he may lose all interest in it. Since most boys are interested in aircraft and flying, projects chosen from that field may well be used to arouse interest and to stimulate the student's enthusiasm.

The drawing of the knuckle pin, shown herewith, is one example of using modern



Details of centering jig



Modern problems for mechanical drawing. Submitted by Howard G. Stintsman

parts as jobs in our mechanical drawing courses. The knuckle pin is not a beginning job in machine drawing, but it could be used after the foundation work is completed.

As an outgrowth of such problems it will be found that the students ask more and more about the operation and function of the various parts of the radial aircraft engine. This permits the teacher to develop a unit on the operation of the radial engine; thus enlarging the student's fund of knowledge and creating an attitude in the student's mind that mechanical drawing is alive, modern, and "on the ball."

TACK HAMMER PAPERWEIGHT

EDWARD BARSKI

Industrial Arts Instructor
Public Schools
Stillwater, Minn.

This simple project can be taught in junior high general metal classes in conjunction with teaching fundamentals of tapping and threading, as well as metal finishing.

After the head is cut to shape from ½ by ½ by 2½ in. square stock mild steel, as per plan, it is filed and draw-filed to obtain a smooth surface, then polished with a fine emery to a high finish; a buffing wheel can be used if available.

Care should be taken in tapping the hole in the head so as not to break the tap. Because of the "blind hole," the bottoming tap should be used after the tapping has been started with a taper tap.

The handle is made from ¼-in. mild steel round stock. It should be slightly beveled to allow easier threading. About 3/16 in. of the rod should be threaded so no threads will show when the handle is screwed into the head. It should also be highly finished with emery cloth.

The wood handle can be forced on after a hole of 7/32 in. is drilled in it. To vary the project, colored plastic handles can be put on instead of the conventional wood type handle.

HOW TO MAKE A TEA TILE

LILY A. PEARCE

Metal Craft Instructor
School of Vocational and Adult Education
Racine, Wis.

The simplicity in design as well as usefulness at home is a challenge for a beginner in art metal work to use "The Tea Tile" as a beginning project.

The project presents a varied number of operations such as layout, wood burning, piercing, engraving, filing, drilling, and finishing of metal, and dapping.

This particular project was made from 16-ga. pewter; however, 16-ga. sheet aluminum can be used now that pewter is one of the scarcer metals.

Tools required:

Five-inch jeweler's saw frame; No. 2 jeweler's saw blade; hand drill; center punch; compass; scriber; chasing hammer; flat file; barrette needle file; graver (can be made from a 10*d*. nail, dapping tool can be made from a 6*d*. or 8*d*. nail); Bunsen burner; bees wax; No. 2/0 and No. 3/0 emery cloth; and bench board.

Materials needed:

16-ga. pewter; brass escutcheon pins ½ in. long; walnut, birch, or maple base.

Suggested procedure:

1. Base (wood)

a) Lay out 6½-in. dia. on selected wood stock 5/8 in. thick and fasten to faceplate.

b) Turn base to size allowing enough depth for 16-ga. (.0625 in.) metal recess.

c) French polish base on lathe.

2. Metal design

a) Transfer pattern in reverse on paper and go over design with soft lead pencil. It is now ready to transfer upon the metal.

b) Heat metal slightly with Bunsen burner. Rub with beeswax and while warm wipe with a soft cloth, removing the excess wax, leaving a thin even coat of wax on the metal which is to receive the pattern transfer.

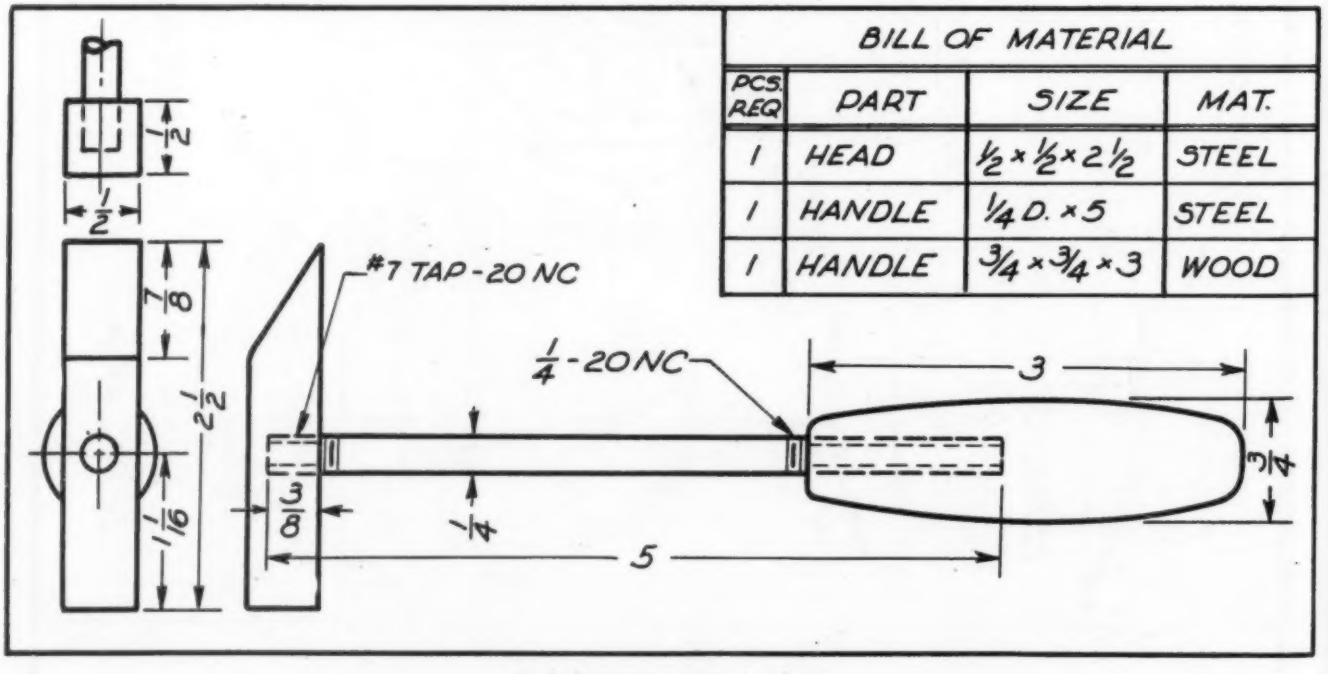
CAUTION: Too much wax will cause smear.

c) Cool.

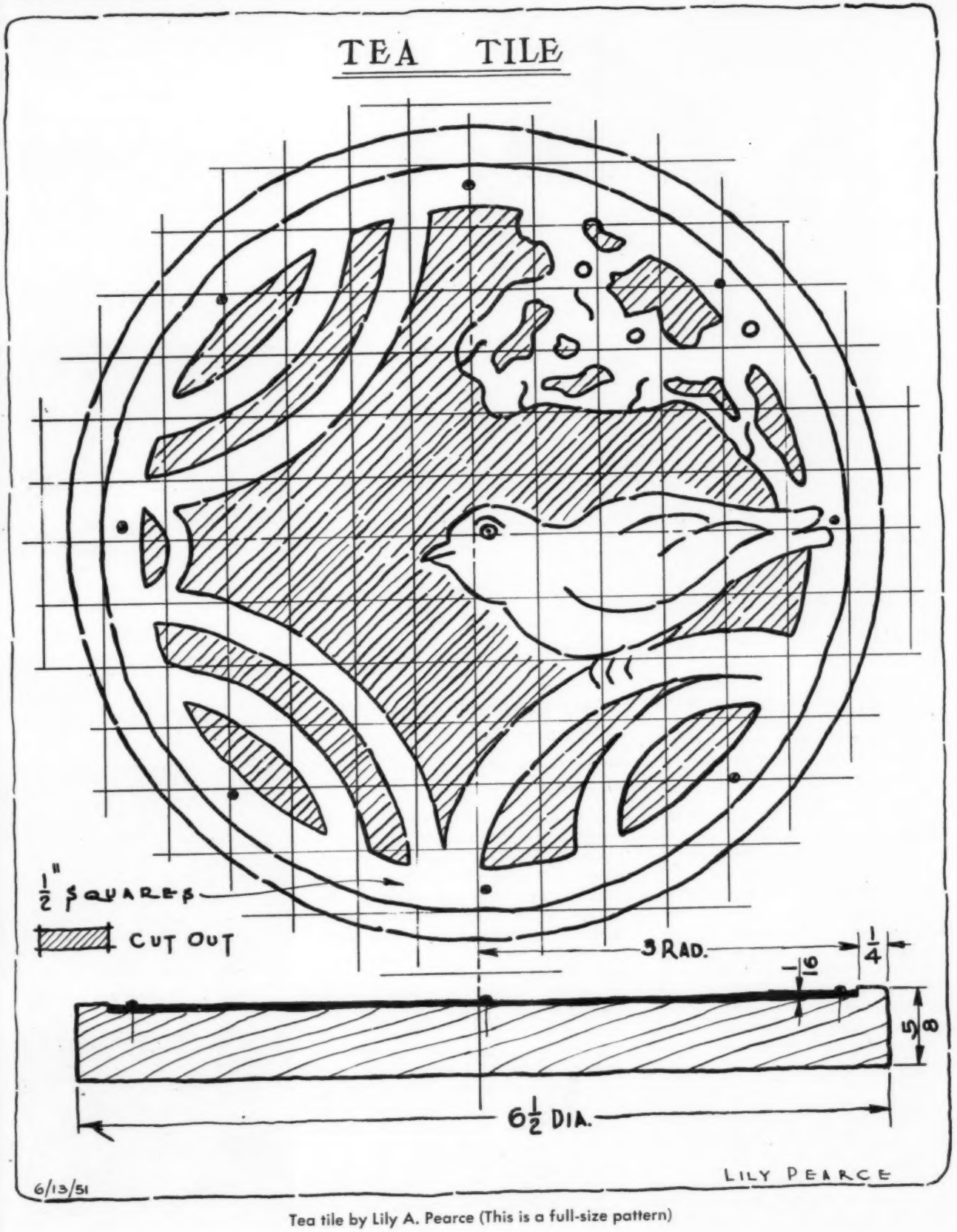
d) Lay lead pencil side on waxed surface and with thumbnail or a blunt tool rub evenly with a firm pressure over entire pattern.

e) Scribe pattern outline.

f) Drill ¼-in. hole in each area to be removed.



Tack hammer paperweight



Tea tile by Lily A. Pearce (This is a full-size pattern)

Tea tile by Lily A. Pearce

g) Cut out area to be removed with jeweler's saw.

NOTE: A small amount of oil or kerosene can be used as an aid while sawing.

h) Remove burrs with flat file and use barrette file for corners.

i) Place stock on a layout table and use a dapping tool of ¼-in. diameter or less, striking design on all edges of branches and inside circle.

NOTE: Hold dapping tool at a slight angle to metal edge and with a chasing hammer, make design evenly around edges.

j) Insert 3/16-in. ring punch marks.

k) Use engraver's tool on bird to give it character. Use ⅛-in. graver and incise eyes, feet, wings, and feather features.

l) Center punch escutcheon pin holes and drill holes. Use a No. 51 twist drill. Remove burrs on back of metal.

m) Finish: (1) Use a No. 2/0 emery cloth and rub only one way. (2) Use a No. 3/0 triple steel wool and rub only one way. (3) Bright finish with soap and water; let dry.

3. Assembly

The tea tile is a forerunner to many other interesting projects within the art-metal field, and a well-executed job on this will lead to many happy hours of work on others.

TWO CERAMIC ASH TRAYS

REGINALD W. SWINYARD

Martin Van Buren High School
Kinderhook, N. Y.

Both ceramic projects described here are made by the slab building process. This process consists of rolling out properly wedged clay to the thickness desired, cutting slabs or shapes from the rolled out clay, and sticking them together to form an object. Naturally the shape of the finished project is controlled by the shape of the various slabs of which it is made. It is a very simple process for beginners in ceramics, and its possibilities are limited only by their imagination.

The ceramic house, which somewhat resembles a birdhouse, is used as an ash tray. When a lighted cigarette is placed through the hole in the front of the house, smoke comes out through the chimney. The chimney is made extra large to allow ashes to be dropped through it into the house. The planter is used for ivy or other small plants, and is made to resemble a hollowed-out log. Both projects require the use of full-size cardboard templates. Either buff or red firing clay may be used for both projects, but the planter looks more realistic if made of red firing clay.

Ash Tray

1. Make full-size cardboard templates of the front, one side and bottom of the house, and front of chimney. The templates for the front of the house and front of the chimney are made by enlarging the drawing, using ½-in. squares. The side of the house is 1 by 3 in., the bottom is 2 by 3 in., and the side of the chimney is 1¼ by 1¾ in. The roof of the house is 3¾ by 5½ in.

2. Wedge clay on the wedging table to make it uniform and to remove air bubbles

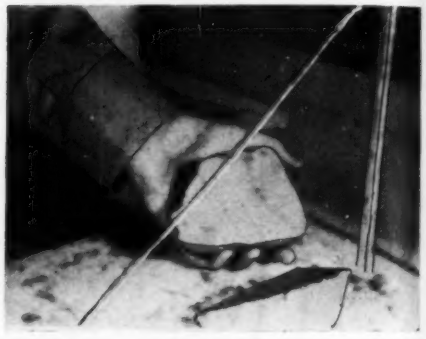


Fig. 1. Wedging clay

and excess moisture. When the clay no longer sticks to the fingers it is ready to be worked. See Figure 1.

3. With a rolling pin, roll out the ball of clay to a uniform thickness of ¼ in. See Figure 2.

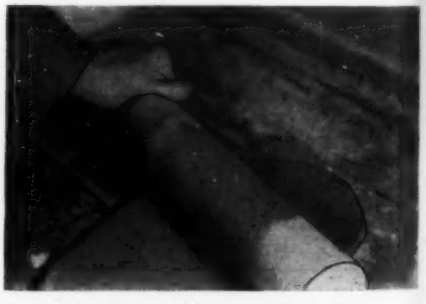


Fig. 2. Rolling out the clay

Fig. 3. Cutting clay slab to shape

4. Place the templates on the slab of clay and cut around them with a sloyd knife, as shown in Figure 3. Lay out bottom, two sides, front and back and roof of house, also front and back and two sides of chimney.

Fig. 4. Building up the house

5. Start building the house by sticking the sides to the bottom, and the front and back to the sides and bottom. See Figure 4. Weld each piece in place by moving it gently so that it forms a good bond with the piece next to it. Use thick slip to aid in the welding. Place the roof on the ends and sides, making sure it overhangs all the way around. Let the roof sag slightly in the center.

6. Cut the opening for the cigarette in the front of the house. Stick a small slab under the opening to act as a cigarette rest.

Fig. 5. Welding on the chimney

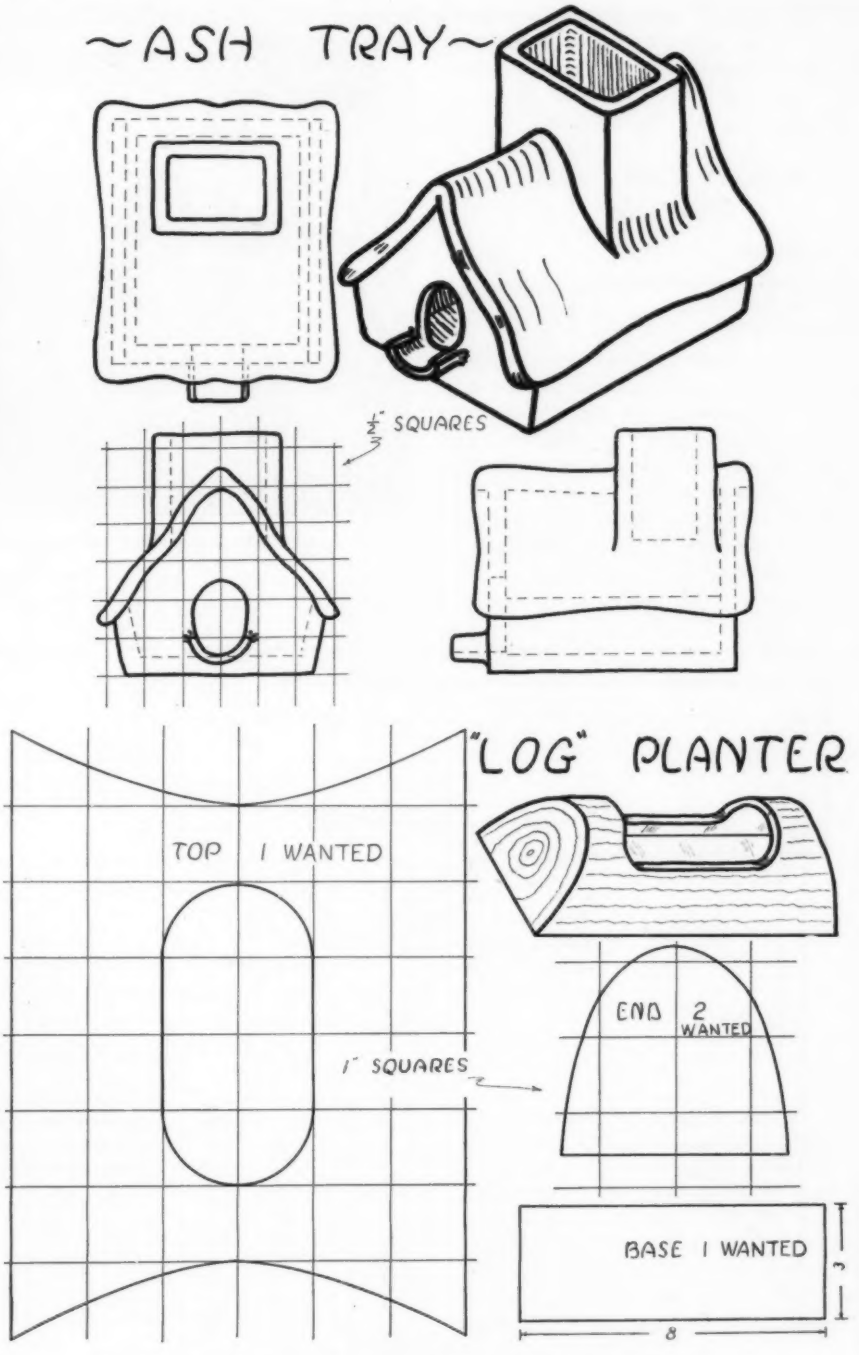
7. Weld the front and back sections, then the two sides of the chimney to the roof. See Figure 5. Place a finger through the opening of the house to support the roof in this operation.

8. Cut the opening down the chimney and through the roof, using a sloyd knife. Weld the joint on the inside of the chimney where it meets the roof.

9. Let the piece dry until leather-hard. Trim off any excess clay and shape the edges of the roof with a sloyd knife.

10. After the piece has dried thoroughly, sand all surfaces until they are smooth, then round all corners slightly.

11. Bisque fire in the kiln to the proper temperatures for the clay you are using.



General shop ceramic projects by Reginald W. Swinyard

12. Apply glaze with brush or spray and fire again. Be sure to use a glaze that fits the clay body.

Log Planter

1. Make full-size cardboard templates of the top, end, and base of the log. The base is 3 by 8 in. Use 1-in. squares to enlarge the top and end templates to full size.

2–3. Follow steps 2 and 3 as explained for the ash tray.

4. Place templates on slab of clay and cut around them with a sloyd knife. Cut two ends.

5. Start building by bending the top section to join the edges of the base. Weld top to base.

6. Place ends against top and base and weld together.

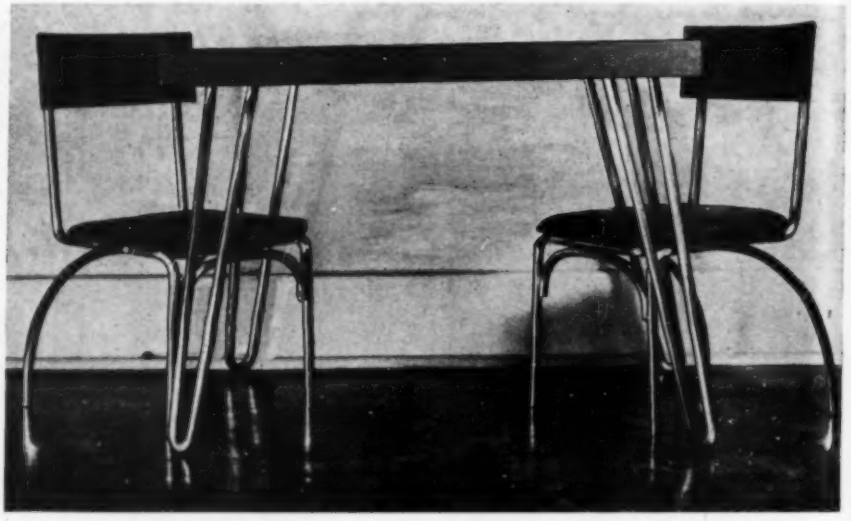
7. Let piece dry until leather-hard. Trim off excess clay and cut grooves in the top and ends to resemble bark and annular rings.

8. Follow steps 10, 11, and 12, as given in the directions for making the ash tray.

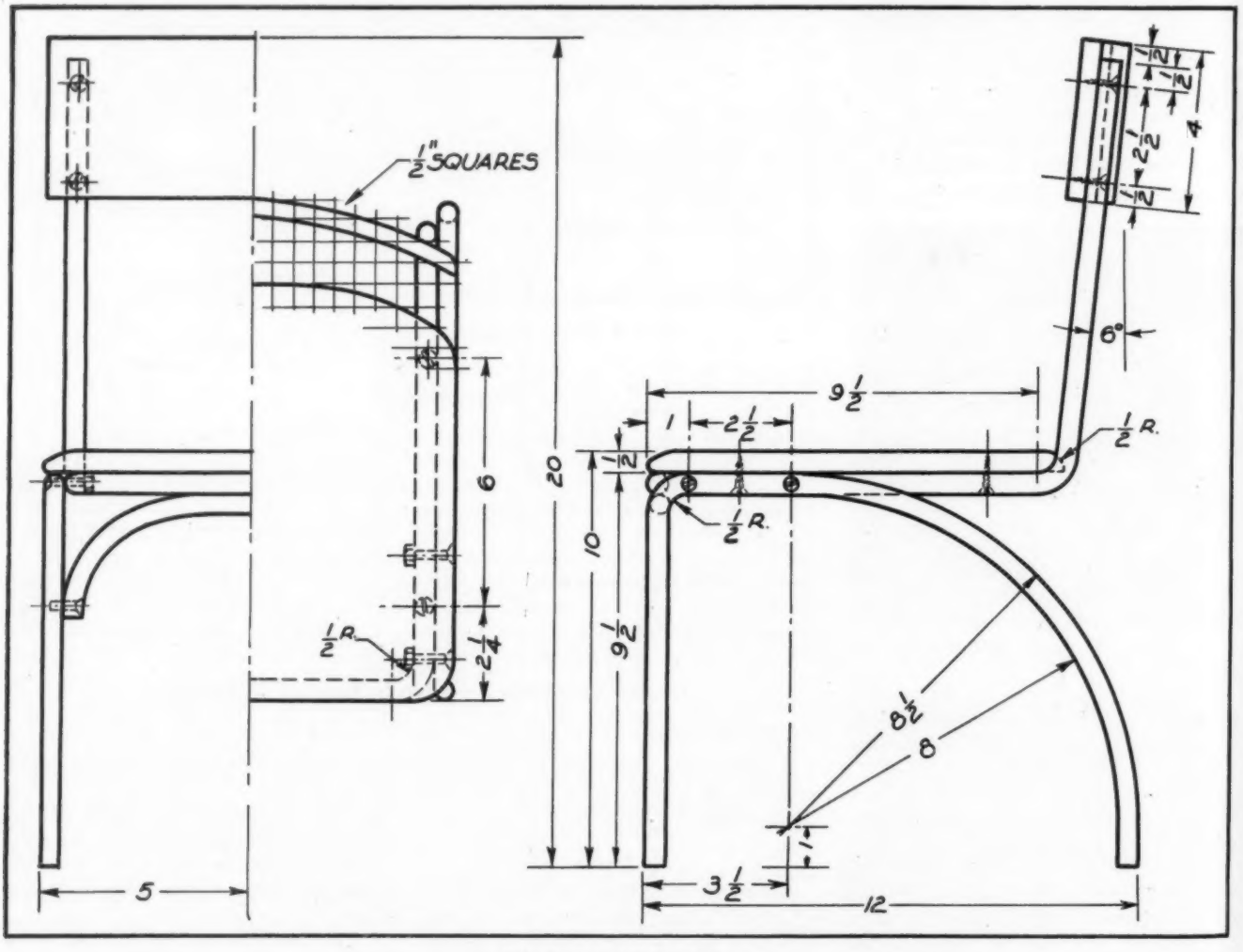
CHILD'S TABLE AND CHAIR SET

E. W. DIEHL
Vocational Machine Shop
Beall High School
Frostburg, Md.

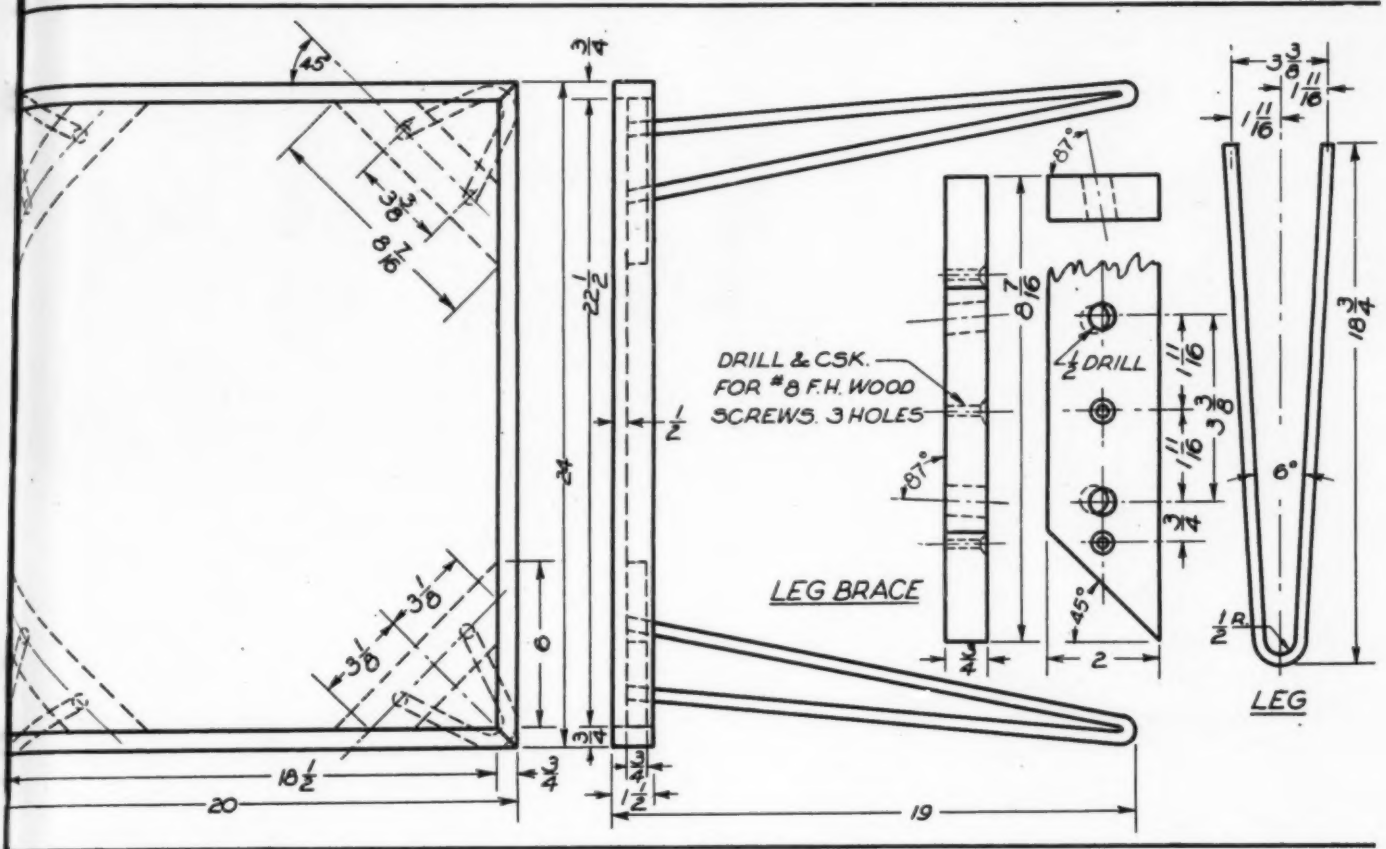
The child's table and chair set, described and illustrated herewith, is simple to construct and unusually strong. The chair is actually capable of supporting a two hundred pound adult. The set would provide an interesting individual industrial-arts project and sets could be made on a production basis in a vocational program for use in kindergarten or lower elementary grades.



Child's table and chair set submitted by E. W. Diehl, Cumberland, Md.



Details of child's chair



Details of child's table

The chair is made of ½-in., solid Alcoa 11s-T3 rod bent cold to match a previously laid out full size pattern of the legs and back. The front and back legs on each side are made of one piece of rod 26½ in. long, which allows for trimming each end after bending. The back and seat support is bent of one single piece of the same size and grade of aluminum rod, 50 in. long, bent around a previously prepared full size pattern.

The aluminum rod used is strong, easily bent, and of a temper that will permit cold bending and slight correction of errors in bending without breakage if care is exercised. The bending is done by holding the straight side of each piece in a vise having soft (lead) jaws placed over the knurled steel jaws. A piece of ½-in. iron pipe is slipped over the end of the rod projecting above the vise jaws and pressure is applied to the pipe. Care must be taken to remove all of the sharp edges from the inside and outside of the pipe end which bears against the rod to prevent the pipe marring the work where the pressure is applied. Using the procedure described it is easy to secure the ½-in. radius shown under the front leg as well as the 8-in. radius on the back leg. After bending, location of the holes is transferred from the full size layout to the bent sections. Holes are then drilled, countersunk, and tapped as shown.

The brace between the legs on the front is made of ½-in. aluminum rod 11¾ in. long. The brace is bent as previously described, locations of the holes established, and they are then drilled and countersunk. The metal parts of the chair are assembled with 8–32 f.h. machine screws.

The seat is made of ½-in. fir plywood, padded with cotton batting, upholstered with leatherette and fastened to the metal portions with No. 8 by ⅞ in. f.h. wood screws. The back is sawed from 1¾ by 4-in. wood, upholstered and fastened in the same manner as the seat.

The legs of the table are of the same material and bent in the same fashion as the chair legs. The table top is made of ½-in. fir plywood 18½ by 22½ in. Strips of poplar or pine ¾ in. thick and 1½ in. wide are glued and nailed to the edges to give an appearance of greater thickness to the top. Four pieces of ¾ by 2 by 8 7/16-in. poplar or pine are prepared as shown in the detail of the leg brace. Particular care must be taken in drilling the holes at the angles shown so that the legs will fit neatly into the braces as no other support is given the

Child's Chair

BILL OF MATERIALS

Part	*Number Required*	*Material*	*Size*
Leg	2	Alcoa 11s-T3 rod	½ in.
Back	1	Alcoa 11s-T3 rod	½ in.
Back	1	Poplar	1¾ x 4 x 10 in.
Seat	1	Plywood	½ x 10 x 10 in.
Leg brace	1	Alcoa 11s-T3 rod	½ in.
		Cotton batting	
		Leatherette	
	4	F.h. machine screws	8/32 x 1¼ in.
	3	F.h. machine screws	8/32 x ¾ in.
	8	F.h. wood screws	⅞ No. 8

Child's Table

Top	1	Plywood	½ x 18½ x 22½ in.
Edge	2	Poplar	¾ x 1½ x 24 in.
End	2	Poplar	¾ x 1½ x 20 in.
Leg	4	Alcoa 11s-T3 rod	½ in.
Leg brace	4	Poplar	¾ x 2 x 8 7/16 in.
	12	F.h. wood screws	1½ No. 8
		Glue	
		4*d*. Finish nails	
		Paint	

legs. In assembling the table, the leg braces are glued and screwed to the top and nailed through the edges. The metal legs are simply slipped into the holes drilled in the braces. The top may be painted, enameled, finished natural, or padded and upholstered.

Chances are you consider yourself a good driver. You don't insist on the right-of-way. You never drive on the wrong side of the road. You use the proper signals.

The truth is this: if you exceed speed limits, you are a *poor* driver. You are a menace to yourself and to everyone who must share streets and highways with you.

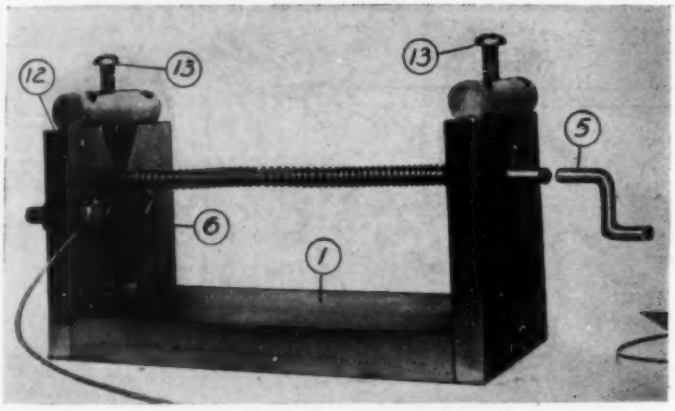
Stop speeding. — *The Travelers Insurance Co.*

U. S. Armed Forces in Arctic and Antarctic regions make extensive use of aluminum because aluminum becomes stronger in subzero weather than it is at room temperature. — *Aluminum Company of America.*

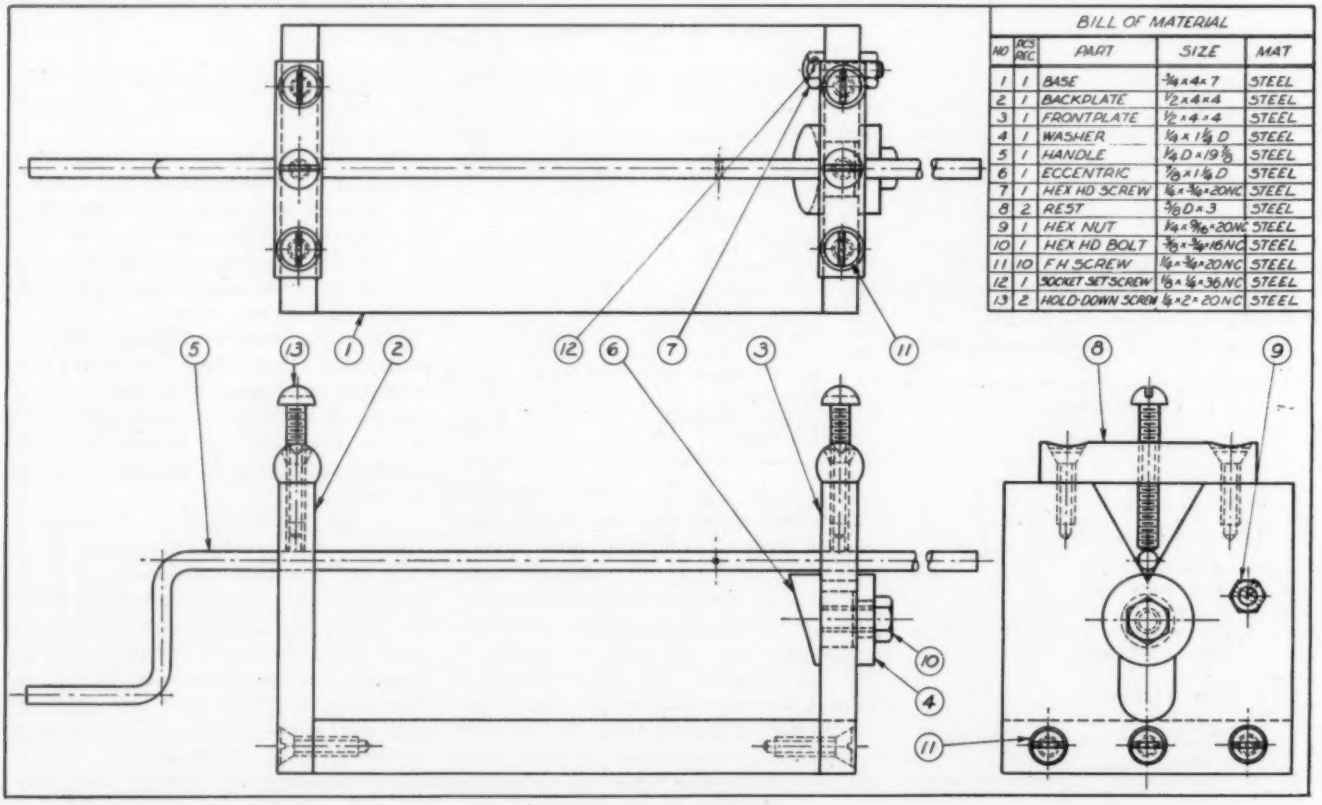
HAND SPRING WINDER

CHARLES E. ADAMS
Detroit, Mich.

The construction and operation of this spring winder is quite simple. The base and frame can be made of cast iron or steel. All other parts should be made of steel. The crank or arbor should be about 1/16 in. smaller than the inside diameter of the spring. A hole about 1/64 in. larger than the diameter of the wire is drilled in about the center of the crank. The wire is first put through the hole of the wire-feeding device and tension applied by means of a small setscrew. This causes the wire to coil snugly and evenly around the arbor. A helical-shaped regulator can be adjusted to give the desired pitch or distance between coils. After putting the wire through the feeding device and then inserting in the crank, the end of the wire should be bent at 90 deg. for about 1/4 in. from the end. This prevents the wire from slipping out of the crank while being turned. The screws at each end located in the center of the bridge pieces hold the crank in place and prevent it from rising. Various diameters can be obtained by changing the arbors. Springs of special forms can be made by turning the arbor to the desired shape on an engine lathe.



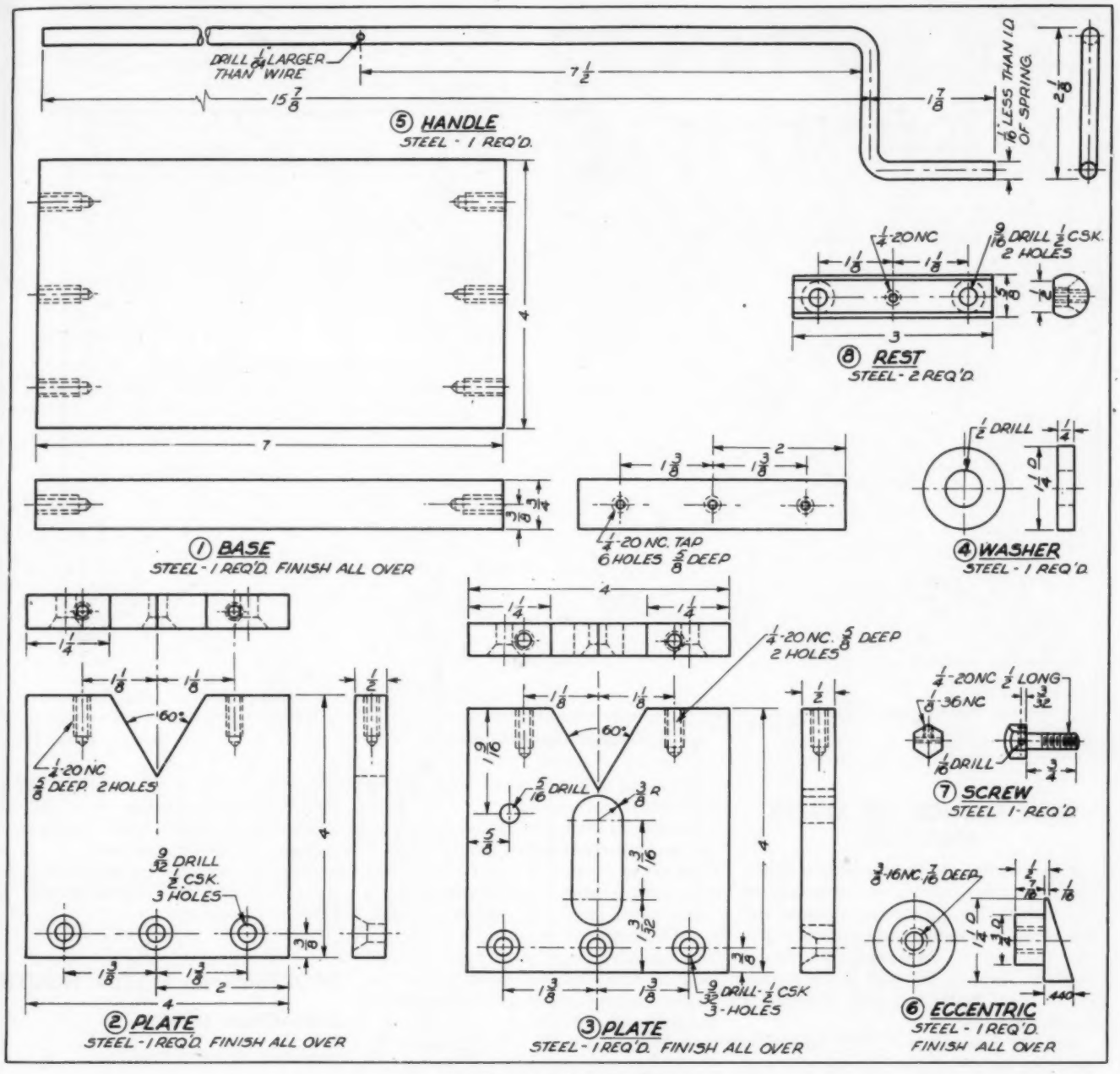
1) Base, 5) crank and arbor, 6) regulator for adjusting pitch of coil, 12) setscrew for regulating wire tension, 13) hold-down screw for holding arbor in place



BILL OF MATERIAL

NO	PCS REQ	PART	SIZE	MAT
1	1	BASE	3/16 x 4 x 7	STEEL
2	1	BACKPLATE	1/2 x 4 x 4	STEEL
3	1	FRONTPLATE	1/2 x 4 x 4	STEEL
4	1	WASHER	1/8 x 1 1/8 D	STEEL
5	1	HANDLE	1/8 D x 19 3/8	STEEL
6	1	ECCENTRIC	1/8 x 1 1/8 D	STEEL
7	1	HEX HD SCREW	1/4 x 3/4 x 20 NC	STEEL
8	2	REST	3/8 D x 3	STEEL
9	1	HEX NUT	1/4 x 9/16 x 20 NC	STEEL
10	1	HEX HD BOLT	3/8 x 3/4 x 16 NC	STEEL
11	10	F.H. SCREW	1/4 x 3/4 x 20 NC	STEEL
12	1	SOCKET SET SCREW	1/8 x 1/4 x 36 NC	STEEL
13	2	HOLD-DOWN SCREW	1/4 x 2 x 20 NC	STEEL

Assembly of spring winder



Details of spring winder

COLLAPSIBLE GLUE TABLE

R. K. DIETERLE

Spring City High School

Spring City, Pa.

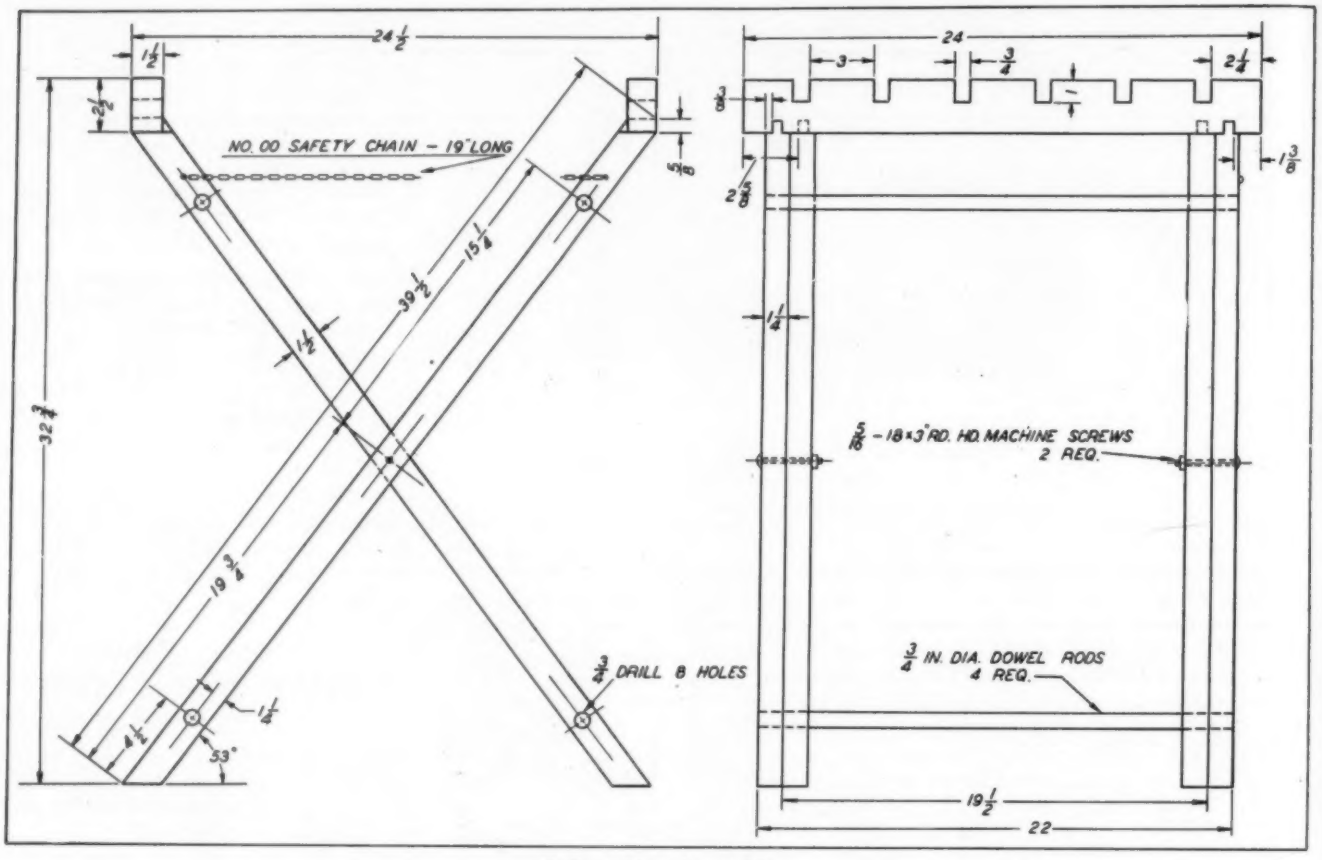
The glue table described herewith may partially solve the ever mounting problem of limited working area.

In every shop it seems that valuable working space is occupied by pieces of equipment which are vital to certain operations in project assembly, but the frequency with which they are used is not sufficient to allot them much space.

Glue tables are almost essential where a quick setting glue is used, but in the general industrial-arts shop we often find ourselves compelled to do our gluing without the aid of a glue table. Light in weight, cheap in materials cost, and easy to construct, this table can be stored in a small space when not in use since it requires only 5 by 24 by 41 in. for storage. Newspapers can be placed under the table while it is in use to catch the drops of glue which may fall from the clamped project.

To accommodate larger projects with more clamps, one could construct a table with longer top rails. However, the specified length was found satisfactory since clamps can easily be added to that portion of the project which would extend beyond the ends of the table.

The material from which it is made can be of any strong, durable wood, such as oak, maple, ash, or birch. To reduce the cost further, short pieces of rope may be used as braces where the safety chain is specified.



Collapsible glue table

NEW METHOD OF STRESS ANALYSIS

A new method of three-dimensional photoelastic stress analysis has been developed by Dr. Max M. Frocht, research professor and director of experimental stress analysis at Illinois Institute of Technology, and Roscoe Guernsey, associate professor at the University of Texas, formerly a research fellow at Illinois Tech.

With the new method it is now possible to determine the actual principal stresses at any interior point of a body.

Prior to this development, only principal shears could be found.

In making such a study, Dr. Frocht first machines a plastic model of the part to be analyzed. This is then placed in a special furnace designed for this purpose.

The loads are applied while the plastic model is heated to a suitable high temperature and are not removed until after the model cools to room temperature. The stresses developed by the loads are in this way "fixed" or "frozen" into the model.

The model can then be sliced or sectioned without disturbing the frozen stresses. These sections, when placed in a photoelastic polariscope, reveal a stress pattern which can be observed and photographed.

The stresses present at any point in a section can be studied in detail and the complete stress system, consisting of maximum, minimum, and intermediate stresses, can be found.

Four points stand out in the development.

1. The method is new.

2. Methods previously proposed required special materials not available in this country. The present method is effective with available materials such as Fosterite.

3. Previous methods were limited to the elastic state. The new method applies to both plastic and elastic stresses in the model.

4. The method has been applied to a specific problem with a great deal of accuracy.

The method makes it possible to study three-dimensional stresses in complicated machine parts and structural elements which had hitherto defied both theoretical and experimental analysis and should materially contribute to more rational and efficient design.

Photoelasticity in general is in wide use in industry and government laboratories as an experimental method of stress analysis.

Dr. Frocht and Guernsey were assisted in the development of this method by David Landsberg, assistant research engineer in the photoelasticity laboratory at Illinois Tech.

A paper giving the theory of the method was presented before the first U. S. National Congress for Applied Mechanics last June in Chicago. The development grew out of an investigation sponsored by the National Advisory Committee for Aeronautics and the Research Corporation.

SPORTSMEN'S LETTER HOLDER

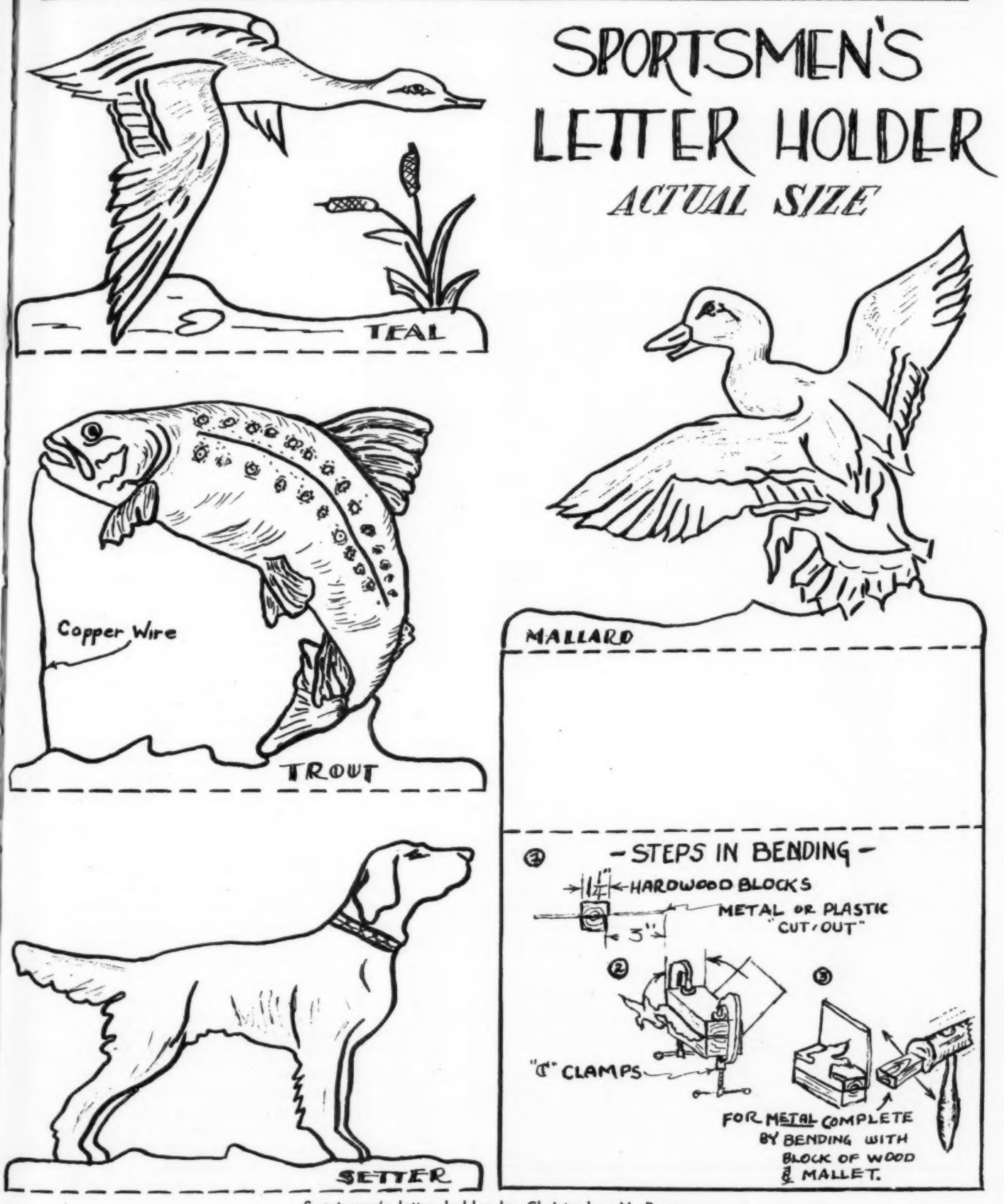
CHRISTOPHER N. ROSE

Instructor, General Shop
Mt. Hebron School
Upper Montclair, N. J.

This project originated through the interest of one of my eighth-grade shop students in "something different" in a letter holder for Dad. During the past three years, it has had various adaptations and changes in silhouettes, dependent on the students' interest and available illustrations.

The sportsmen's letter holder, because of its size, is suggested as a means of introducing art metal or plastic work to the limited shop program and to keep these units active during the current shortages of strategic materials.

Among the short cuts we have found while



Sportsmen's letter holder by Christopher N. Rose

developing this project in our general shop are:

1. A 4 by 8-in. piece of 16-ga. aluminum or copper, or 3/16-in. clear plastic.

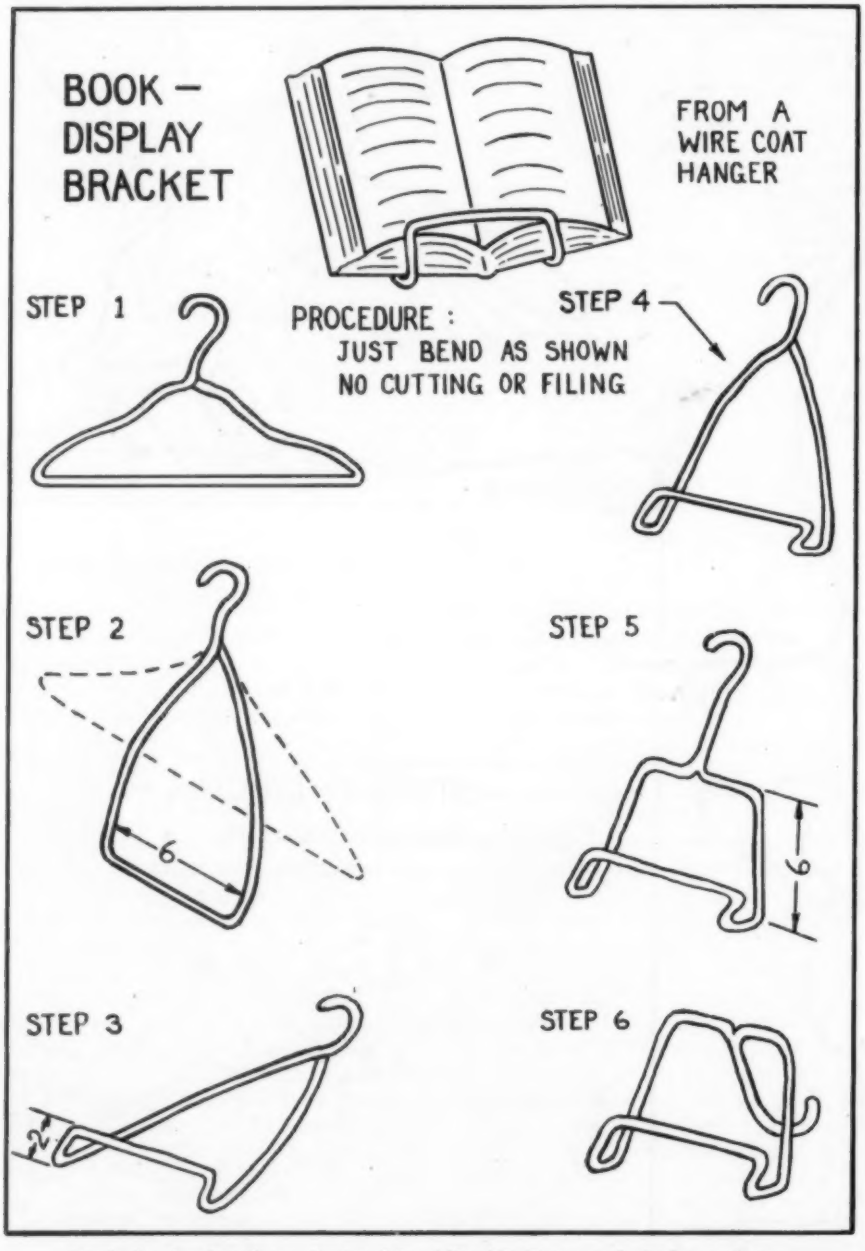
2. The use of oak-tag paper patterns to transfer the designs to the tracing paper overlay. Considerable care should be given to the tracing — all detail should be complete to the last degree before securing it to the project media.

3. The use of rubber cement for securing the tracing overlay to the project media whether metal or plastic.

a) Since the tracing overlay does not smudge easily or rub off, it provides an accurate outline to which the student may do his cutting and detail work.

4. After completely cutting out the project design — the hand or flexible shaft grinder may be used with a round burr to add the necessary detail to the project. The completeness of the tracing and the size of the burr used in the grinder must be gauged to lend emphasis to the details of the silhouette. Remove tracing overlay, and bend.

By varying the details and techniques used in the silhouettes, students — grades 5–9, boys and girls alike, find a challenging project.



Book-display bracket submitted by Alfred E. Cavanagh, industrial-arts consultant, Kensington School, Great Neck, N. Y.

STAFF PLANT HOLDER

REGINALD W. SWINYARD
Martin Van Buren High School
Kinderhook, N. Y.

Here is a project ideally suited for the general shop since it covers the areas of wrought iron, art metal, wood turning, and ceramics. Although a small flowerpot may be purchased to hold the plant, this would eliminate the wood turning and ceramics areas. Instead, a form is made for the flowerpot on the wood lathe, approximately five per cent oversize. From this form a one-piece plaster mold is made from plaster of Paris. After the mold has dried thoroughly, a slip casting is made from it. Since buff firing clay shrinks approximately five per cent upon drying and firing, the flowerpot will be the correct size to fit into the bottom of the treble cleff. Cut a 1/4-in. hole in the center of the bottom of the pot before the bisque firing. The pot may then be glazed any suitable color.

BILL OF MATERIALS

No. of pieces	*Part*	*Material*	*Size*
5	Staff lines	Band iron	1/16 x 3/8 x 9 in.
3	Staff bars	Band iron	1/16 x 3/8 x 4 3/8 in.
1	Cleff sign	Band iron	1/16 x 3/8 x 26 1/2 in.
1	Sharp sign	Brass	No. 20 x 1 x 1 1/8 in.
1	Two eighth notes	Brass	No. 20 x 1 3/4 x 3 3/4 in.
1	Quarter note	Brass	No. 20 x 1 1/8 x 2 3/8 in.
1	Pot form	Hardwood	3 x 3 x 4 in.
	Plaster of Paris		
	Casting slip		

Construction Procedure

1. Make a full-size drawing of the project, using 1/2-in. squares.

2. Cut band iron to length, either with hack saw or with cold chisel on anvil.

3. Using a bending jig, bend the treble cleff sign carefully, checking it frequently against the full-size plan you have made.

4. Either rivet, solder, or braze the staff and cleff sign together.

5. Cut the sharp sign, two eighth notes, and quarter note from the three pieces of No. 20 brass, using a jeweler's saw. File edges smooth and even.

6. Tin the backs of the brass pieces and sweat solder them to the staff in the indicated positions.

7. Buff the three brass pieces, using tripoli and rouge, wash with soap and warm water, dry, then lacquer.

8. Paint the staff and treble cleff signs with black enamel.

9. Turn the form for the flowerpot on the wood lathe. Be sure to make it about 5 per cent oversize to allow for clay shrinkage.

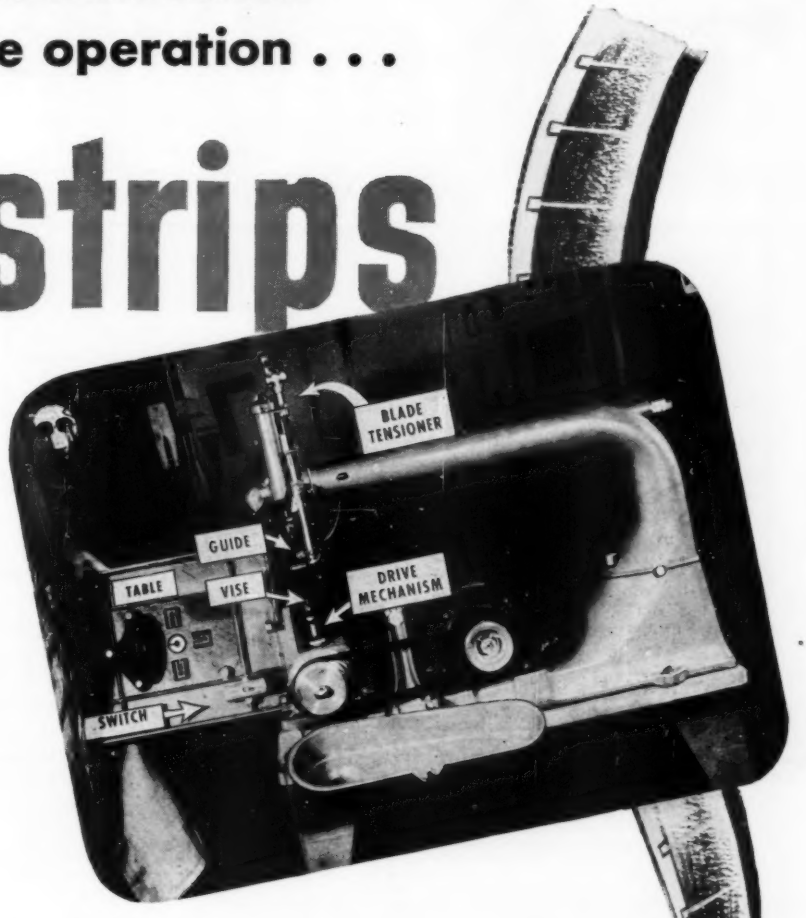
10. Pour a plaster of Paris mold of the pot form. Dry thoroughly.

11. Make slip casting in mold. The walls of

(Continued on page 18A)

for graphic instruction in machine operation . . .

filmstrips



Now, by means of filmstrips, Walker-Turner demonstrates correct way to use power tools

What's the first step in sawing a rabbet in a board? How does the toothed pawl operate to prevent kickbacks? What is the correct method of removing a blade from the arbor?

Questions like these are answered—by demonstration—in a series of six filmstrips produced by Popular Science Publishing Co., in conjunction with Walker-Turner. Each filmstrip presents a power tool in such a way that the student understands thoroughly how the machine works (an introductory filmstrip covers the evolution of machines).

Here are step-by-step directions for performing the basic operations on the machines usually found in school shops—the Jig Saw, Drill Press, Band Saw, Shaper, and Circular Saw. Filmstrips show clearly the interrelation of machine parts, how they may be adjusted and set up to perform specific operations.

Directions and suggestions to the teacher for showing the filmstrips, as well as student questions, are contained in a teaching guide prepared for each filmstrip. For complete information, mail the coupon today.

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Please send me complete details on filmstrips

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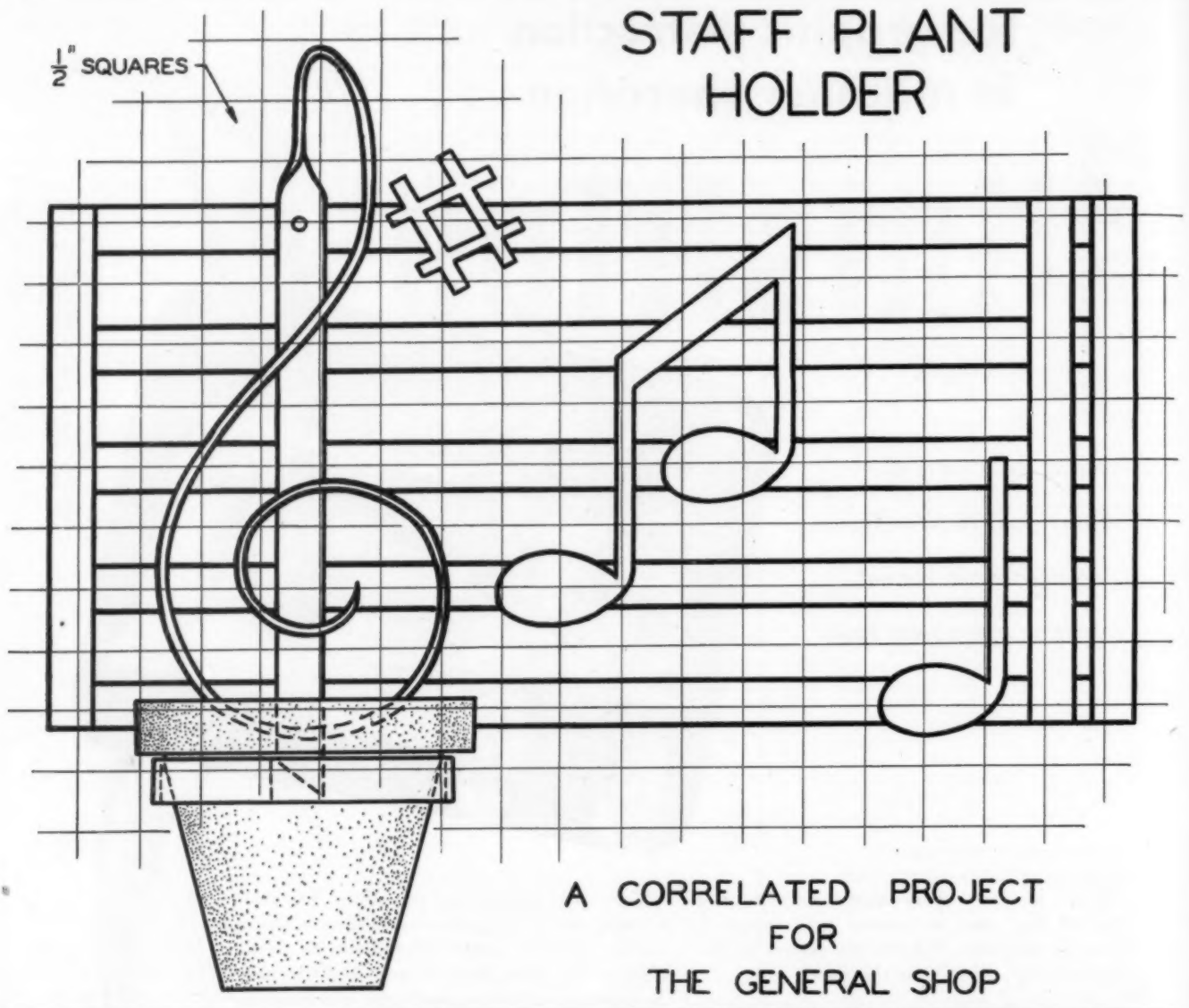
School.....

Address.....

City..... Zone..... State.....



PLANT HOLDER

(Continued from page 62)

the casting should be at least ¼ in. thick. Cut ¼-in. diameter hole in center of bottom.

12. Bisque fire and glaze fire the flowerpot.

NOTE: Steps 9 through 12 may be omitted if a small flowerpot is purchased.

ASSOCIATION NEWS

(Continued from page 9A)

ANNUAL E.P.T. GAMMA FIELD CHAPTER MEETING

The annual banquet and business meeting of Epsilon Pi Tau, Gamma Field Chapter of Oakland, San Francisco Bay Area, was held at the Moose Club dining room on December 7, 1951. Twenty-seven members and guests enjoyed a very pleasant evening.

The newly-elected officers for 1952 are: Paul O'Rourke, president; Don Taylor, vice-president; Beverly Mason, treasurer.

Personal News

MARSHALL LYMAN BYRN 1887–1951

Marshall Lyman Byrn, 64, assistant professor of vocational education at the University of Michigan and head of the industrial arts department at the University High School since 1926, passed away on November 23, 1951, after a long illness. Although in ill health for some time, he was able to remain active until a few weeks before his death in University Hospital.

Professor Byrn, "Marshall" to all of his associates and friends, was an outstanding figure in his fields and one of the best loved men in industrial arts and vocational education. He had a personality seldom found in men of his caliber and enthusiasm that was outstanding and contagious. His friendliness, devotion to his work, and willingness to help his fellow men, often at great personal sacrifice, will be remembered by all who knew him. His continued interest in the teaching of his boys rather than too much administration was outstanding and contributed greatly to his success as a master teacher. He was always one of the boys and loved by all of them.

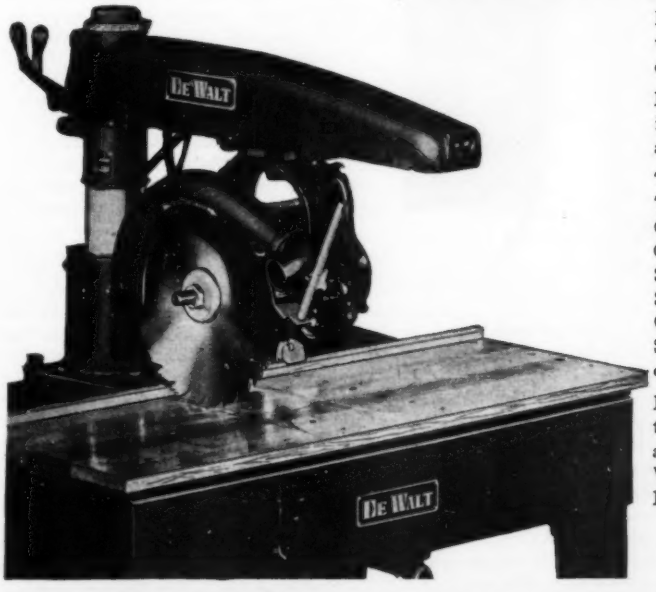
A man of many interests, Professor Byrn had many hobbies including music, aviation, camping, and outdoor sports and had developed outstanding abilities in a number of industrial-arts fields, especially in silver-smithing and in automobile and aeroplane mechanics. He could do many things well and was proud of the fact that he could practice what he preached.

As an outstanding educator, Professor Byrn was active in many professional organizations and served on many important committees. He held numerous offices in the Michigan Industrial Education Society including the presidency in 1931–32. It was this society that conferred upon him, in 1949, the title of Master Teacher, its highest

(Continued on page 20A)

DEWALT

...the ideal all-purpose machine for vocational schools



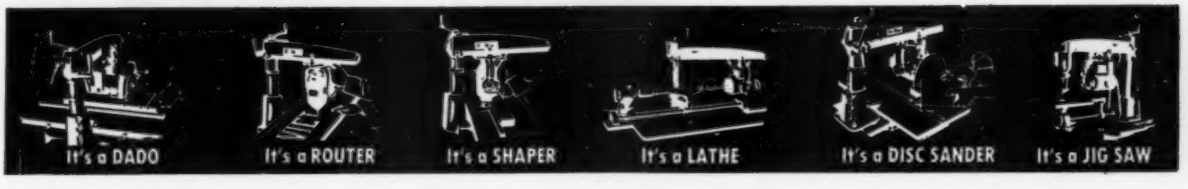
Hundreds of schools today are using DeWalt in their vocational training. This world-famous radial power saw enables students to learn *now* for *tomorrow!*

DeWalt is fast—accurate—safe. It's the basic woodworking machine for doing everything in woodworking. It also cuts plastics and light metals.

This *basic woodworking machine* includes: Pressed Steel Table Frame, Table Top Assembly on Steel Leveling Cleats, Machine Column and Base and Cantilever Arm, Grease Shielded Ball Bearing Carriage with frictionless Swivel Yoke Assembly, Direct Drive Motor with Grease Sealed Ball Bearings, Formex-Fiberglass Insulation, Overload Protective Cut-Out Switch, Special School Safety Saw Guard with Anti-Kickback Device and Set of Wrenches.

DeWalt is compact—takes up little floor space. Investigate the full merits of this all-purpose machine. It is available in models ranging from ½ H.P. to 7½ H.P. Write for complete information. Address: Dept. IA-12, Fountain Avenue, Lancaster, Pa.

DEWALT INC.
A subsidiary of American Machine & Foundry Co.



PERSONAL NEWS

(Continued from page 18A)

honor. He was also a member of the American Vocational Association and Epsilon Pi Tau, Mu Sigma Pi, Phi Delta Kappa, and Alpha Epsilon Mu fraternities.

Professor Byrn was a contributor to numerous publications and was chairman of a research committee of the Michigan Industrial Education Society which produced "General Shop and Household Mechanics" published by the Michigan Department of Public Instruction in 1932. He served as a consultant to many school systems and was a frequent speaker before educational groups throughout the country. His biography is included in the volume "Leaders in American Education."

Marshall L. Byrn

Born on September 24, 1887, in New Salisbury, Ind., Professor Byrn was educated in the states of Indiana and Michigan. He was graduated from high school at Indiana State Normal College, Terre Haute, in 1908. He earned a bachelor's degree at Michigan State Normal College, Ypsilanti, in 1923 and a master's degree at the University of Michigan in 1926.

From 1913 to 1916, Professor Byrn taught at the Crookston, Minn., High School, at which time he became a member of the staff of the automotive department at Cass Technical High School in Detroit, Mich. He served there until 1924 when he joined the original staff of the University High School at the University of Michigan at Ann Arbor. Two years later, he was named to the positions of head of the department of industrial arts and assistant professor of vocational education, the positions held at the time of his death. — GEORGE A. WILLOUGHBY.

♦ SIDNEY C. HIGH, JR., who received both his B.S. and M.S. degrees in industrial-arts education at North Carolina State College and formerly taught industrial arts at the Hugh Morson High School in Raleigh, N. C., has been appointed industrial-education specialist for the Economic Cooperation Administration, Special Technical and Economic Mission to the Philippines, in Manila. He is the only member of the mission who is an industrial-education specialist. The position carries with it much responsibility.

High left the United States in 1950 to serve as specialist in industrial arts under the Fulbright plan to set up a model industrial-arts laboratory at the Philippine School of Arts and Trades. High was quite successful in this capacity in which he served for one year.

♦ V. L. PICKENS, division chairman of Practical Arts, Kansas City Public Schools, addressed the industrial-arts and vocational sections of the Louisiana Education Associated meeting in Shreveport, November 20, 21. He also visited Northwestern State College in Natchitoches and addressed a joint meeting of home economics and industrial-arts students.

♦ ARTHUR H. LUEHRING, associate professor of industrial arts at Indiana State, retired at the close of the spring term in June of 1951.

Mr. Luehring came to Indiana State in 1915 after serving his apprenticeship in machine shop with Allis-Chalmers in Milwaukee.

He taught classes in machine shop, forge, welding, foundry, heat treating, and metallurgy and often assisted with other areas when his services were needed.

He assisted with the installation of the equipment in the Vocational Building and organized and taught the first courses in metals at Indiana State. As a matter of fact, his work and efforts in the metals area has influenced the teaching of this work in scores of schools throughout Indiana and in other states.

He received the B.S. degree at Indiana State; the M.S. degree at Indiana University where he also took some graduate work.

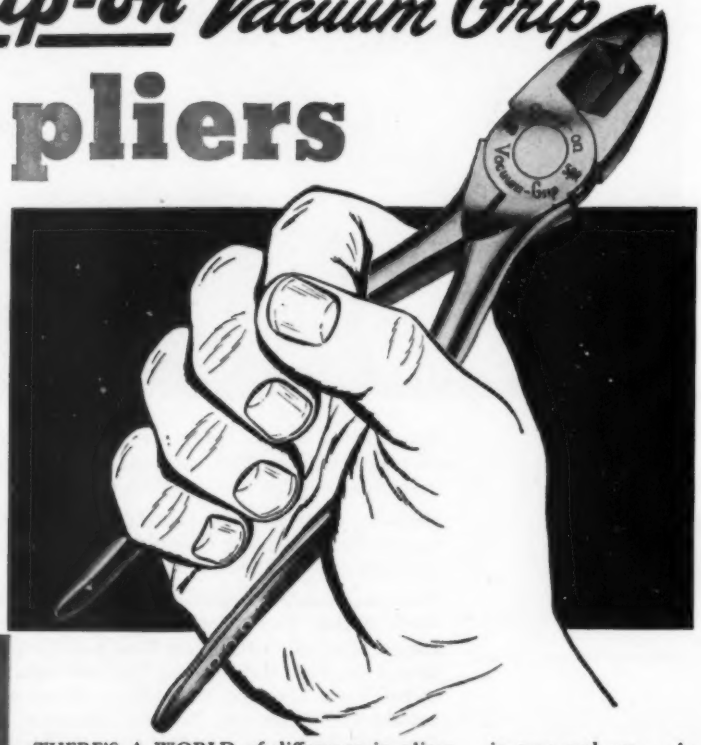
He is a member of the A.V.A.; the Indiana Industrial Education Association; Indiana State Teachers Association; and the American Society of Metals. He made frequent contributions to professional magazines and he visited schools in order to assist teachers with individual problems.

Mr. Luehring was a charter member of Mu Chapter of Epsilon Pi Tau and he served as faculty sponsor and trustee of this organization since 1943.

On July 11 about 135 of his friends and associates gave a dinner at the Student Union Building in his honor.

(Continued on page 22A)

Snap-on* Vacuum Grip pliers

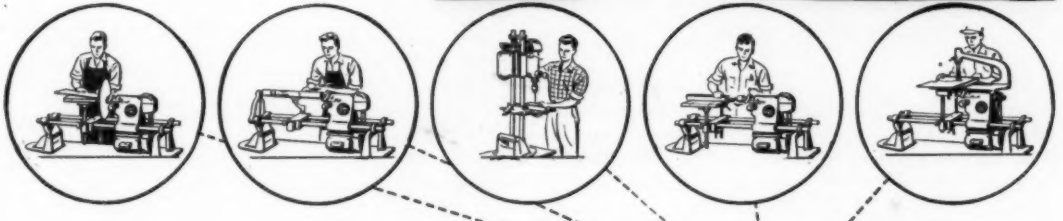


THERE'S A WORLD of difference in pliers . . . in type and use . . . *in quality* and *durability*. It's important that, in everyday training, students *learn* the difference! Snap-on Vacuum Grip Pliers are made in a complete range of 31 types and sizes . . . only *one* quality . . . the finest the toolmaker's craft can produce! Hammer forged from special alloys . . . specially heat treated and hardened clear through . . . they are built to outlast several pairs of ordinary pliers. Joints are precision machined, perfectly matched, locally tempered, easy riding. Sharp, deeply milled teeth give intense gripping power with minimum pressure. The vacuum grip handles provide non-slip security. Snap-on Vacuum Grip Pliers are described in the complete 104-page Snap-on catalog—sent free to school officials and shop instructors.

*Snap-on is the trademark of Snap-on Tools Corporation

SNAP-ON TOOLS CORPORATION
8074-B 28th AVENUE, KENOSHA, WISCONSIN

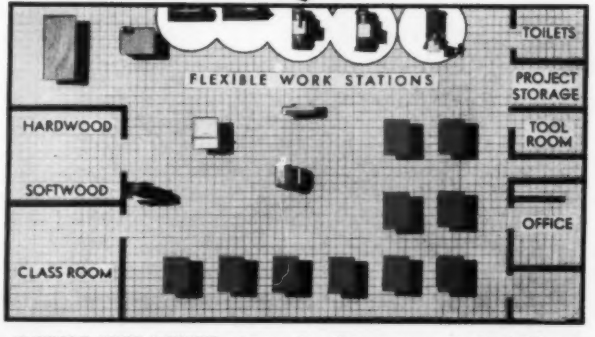
Flexible work stations boost school shop efficiency



IT HAPPENS in the best of shops—work piles up on various single-purpose power tools. Students stand idle awaiting their turn. Machines not in demand are idle, too.

But in the Flexible Shop (a school shop equipped with several SHOPSMITHS) the pile-up problem all but disappears. The SHOPSMITHS provide *flexible work stations*. Each converts to an 8″ circular saw, 12″ disc sander, 33″ wood lathe, 15″ drill press, horizontal drill or jig saw. The instructor can vary his assortment of equipment to fit his need. Or he can set up all tools alike for group instruction.

In each of its basic positions, SHOPSMITH is essentially the same as a single-purpose tool—*equals* or *outperforms* the tool it replaces. Its cost is $232.45 complete with ½-hp. motor and special school guards (jig saw attachment $34.95 extra). It takes a storage area 18″ x 60″ and a working area 6′ x 8′. Write for full information and specifications.



FLEXIBLE SHOP LAYOUT *shows five* SHOPSMITH *work stations. Flexibility is equivalent to shop equipped with 25 single-purpose tools. Arrangement provides maximum efficiency at minimum cost and in minimum space.*

SHOP SMITH

MAGNA ENGINEERING CORP., Dept. 204-U

at factory nearest you.

12819 Coit Road, Cleveland 8, Ohio, OR Menlo Park, California

Please send me complete information about the FLEXIBLE SHOP and the applications of SHOPSMITH to industrial arts education.

Name_____ Position_____

School_____

Address_____

City_____ State_____

PERSONAL NEWS

(Continued from page 20A)

As a tribute to his work and efforts, he was presented with a television set and a bound volume of over 300 letters written by friends, students, and associates.

♦ B. A. KNIGHT, head of the department of industrial-arts at the Geo. Washington High School, Indianapolis, Ind., has retired. Mr. Knight had been at Geo. Washington High School since its founding and taught drafting in addition to his duties as department head. He is succeeded by U. D. Walker.

♦ ALBERT C. HIRSCHMAN, machine-shop teacher at Emmerich Manual Training High School, Indianapolis, Ind., retired after a long period of service. Mr. Hirschman had been in ill health during the latter part of his career but was able to return to the job before his retirement.

♦ M. F. CONNER, L. J. PRITCHARD, and HERSCHEL WHITAKER, from the Junior High School industrial-arts division, Indianapolis, Ind., retired after many years of service.

♦ POP KOEHNEN retired after 34 years of teaching in Evansville, Ind., schools. These 34 years are matched with his years as a boy scout counselor. His retirement will mean more time to help boys with special merit badge work.

♦ W. A. RUSH, instructor of radio at the Arsenal Technical Schools, Indianapolis, Ind., retired at the close of the last school year.

♦ DALE F. GRIFFIN, formerly instructor of carpentry, resigned from a position as vice-principal after 34 years at Arsenal Technical Schools, Indianapolis, Ind. EARL W. ENSINGER was advanced from the position of head of the drafting department to succeed Mr. Griffin. WARREN E. CLEVELAND is now head of the drafting department.

♦ Teachers in the Junior High School who are beginning service this year with the Indianapolis Public Schools are: GERHARD NIEMANN, DIAMOND HAYS, DAVID D. BRAY, and V. M. McDOWELL, all from Ball State Teachers College; and LEON HUNT, JOHN B. PERRY, from Indiana State Teachers College; also E. A. TURNER from Plattesville, Wisconsin State Teachers College.

JACOB L. JONES, vocational co-ordinator and placement officer at Arsenal Technical Schools, Indianapolis, Ind., for the past ten years, retired last June. Mr. Jones, who is well known in industrial education circles in Indiana, was employed by the Indianapolis Schools for forty years, 36 of them having been at Arsenal Technical Schools. HERMAN L. DENZLER, former assistant of reclassification, counselor, and drafting instructor, has been appointed to succeed Mr. Jones.

♦ Robert L. Schonewolf, drafting department instructor in the Amherst Central High School at Snyder, N. Y., reports that drawing boards covered with Masonite tempered hardboard have been in use for over ten years and will last for many more. Previously it was necessary to replace wooden drawing boards each three years. Two years ago, he states, all their plywood drafting desks were covered with Masonite to replace the splintered and peeled tops, and they have proved an excellent working surface and are money savers.

♦ Robert C. Stucker of Cleveland, Ohio, has been appointed general manager of the Educational Lumber Division of the Hardwood Corporation of America, Asheville, N. C.

The new Educational Lumber Division was established recently to specialize in hardwood lumber for use in industrial-arts and vocational education.

Associated with Stucker in the new Educational Division will be Blake L. Lytle, who has had more than 25 years' experience in the hardwood lumber industry in the yard, mill, purchasing, and shipping operations.

The new Educational Lumber Division of the Hardwood Corporation of America will open offices in Asheville, N. C., and a catalogue announcing the complete line of lumber species will be made available to all schools, colleges, and universities.

MASTER'S DEGREE GRADUATES
University of Missouri, 1950–51

WILLIAM S. BENNETT, Co-ordinator, Distributive Education, Artesia, N. Mex.

VINTON E. DECKER, Instructor of Industrial Arts, Simenson High School, Jefferson City, Mo.

ROBERT B. FISCHER, Industrial Arts Instructor, Irving School, St. Louis, Mo.

GLENN R. HARRISON, Instructor of Industrial Arts, Central Junior High School, Hannibal, Mo.

LEWIS C. HARRISON, Instructor in the Aircraft Maintenance Curriculum Department, Institute of Aviation, University of Illinois, Urbana, Ill.

MORRIS W. HILYARD, Instructor of Industrial Arts, Brentwood High School, Brentwood, Mo.

JAMES H. MAHONEY, Instructor of Industrial Arts, Senior High School, Hannibal, Mo.

WILLIAM H. MIDDLETON, Instructor of Industrial Arts, Illinois.

ROBERT L. MILLER, Instructor of Woodwork, Central Senior High School, Kansas City, Mo.

GEORGE W. MULLING, Trade and Industrial Education Supervisor, State Department of Education, Atlanta, Ga.

(Continued on page 25A)

SHELDON
CHICAGO U. S. A.

These 3 quality machine tools are especially adapted to school use because of their:

AMPLE SIZE — permits wide range of practical projects.

STANDARD DESIGN — true industrial tools with standard controls.

PERMANENT ACCURACY — these tools hold their accuracy under student abuse, do not require constant rebuilding and servicing.

SAFETY — all drives completely enclosed; all speed changes made by external levers.

PRICE — these are moderate priced tools that school shops can afford.

Write for the SHELDON Catalog showing and describing (with complete specifications) the line of: SHELDON Precision Lathes (9", 10", 11", and 13" Swing), Sheldon Milling Machines, Sheldon Shapers and Sheldon Machine Tool accessories and attachments.

Horizontal Milling Machine — No. TS56B 11¼" Swing Lathe — 12" Back Geared Shaper

SHELDON MACHINE CO. Inc.
Manufacturers of Sheldon Precision Lathes • Milling Machines • Shapers
4244 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U. S. A.

Kodak

Make the Most of Your Color Slides

THE KODASLIDE PROJECTOR, MODEL 2A

Gives Brilliant Performance For Small Group Showings

With the Kodaslide Projector, Model 2A, you put your slides on the screen with an *extra* measure of clarity and dramatic realism—give them maximum effectiveness for sales presentations, training, education, and entertainment. Light, compact, and easy to carry, it's the ideal projector for small audience showings.

Ultra-sharp, sparkling projection is assured by a Lumenized optical system for increased light transmission and even illumination. Quick, easy lens barrel focusing and a built-in elevating mechanism make this projector a pleasure to operate. What's more, your transparencies are fully protected by heat-absorbing glass and adequate ventilation.

Durably constructed with a die-cast aluminum case, the Model 2A Kodaslide Projector is designed for long, trouble-free service. A 5-inch *f*/3.5 lens blows up your 2 x 2-inch transparencies to 84-inch screen images. Price, $52.80. Carrying case with a shielded 10 x 10-inch screen inside the case lid, $15. Projector remains in case during slide presentation. See this truly outstanding projector at your nearest Kodak Audio-Visual dealer's or mail the coupon for complete information to Eastman Kodak Company, Rochester 4, N. Y.

Prices subject to change without notice and include Federal Tax where applicable.

FOR EDUCATION AND ENTERTAINMENT

Perfect for classroom visual instruction and entertainment. Light, compact, easy to move about, set up, and operate. Brilliant screen image is easy on the eyes and captures immediate attention.

PHOTOGRAPHY...

teaches, trains, entertains

EASTMAN KODAK COMPANY, Rochester 4, N.Y. 193

Please send me complete information on "The Kodaslide Projector, Model 2A."

NAME_____

STREET_____

CITY_____ ZONE_____

STATE_____

helps develop creative skill

STANLEY

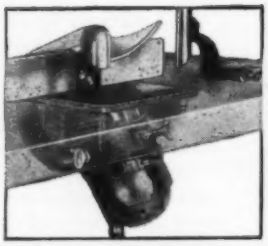
Router R8A

When you put the Stanley Router R8A in the hands of your students you help to build confidence, give them an opportunity to develop and demonstrate their creative skill.

There's practically no limit to the number of operations this versatile tool can perform. Use it for inlaying, veining, rabbeting and many other woodworking jobs. Easily interchanged attachments and accessories make this complete power unit—*many tools in one.*

Stanley Router R8A has ½ h.p. high-speed motor—20,000 r.p.m.—assures a smooth cut with or against the grain. Operates on A.C. or D.C. Weighs less than 7 lbs.

See this basic creative tool at your dealer's. Also available is Booklet "Get the Best From Your Stanley Router". Price 10c. Send for catalog showing complete line of Stanley Electric Tools.



For Shaping. Converts R8A to a bench shaper for making a variety of moulding and shaping cuts on straight and irregular work. Arbor tilts to 45°.

For Dovetailing. Available in two sizes for stock to 12" and 16" wide. Easy to use. For wood or plastics.

Attachments for Planing, Beading and Fluting, Grinding, and Overarm Mounting also available.

Stanley Electric Tools, New Britain, Connecticut

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Reg. U.S. Pat. Off.

Hardware • Tools • Electric Tools • Steel Strapping • Steel

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Stanley Electric Tools, Educational Dept.
411 Myrtle St., New Britain, Conn.

☐ Send me your catalog.

☐ Send booklet "Get the Best from Your Stanley Router". Enclosed is 10c per copy.

Name.....

Subject you teach.....

School.....

City.....State.....

"I can't say enough for the performance of my Harper Kiln"

says a New Rochelle Sculptress

Show left is Miss Lisbeth Schaeffler of New Rochelle, N. Y., unloading beautifully hand-made ware from her Harper Electric Studio Kiln SK-151416. In a recent letter, Miss Schaeffler who purchased her Harper Kiln 5 years ago says:

"I can't say enough for the performance of my Harper Kiln. I have fired it on the average of once a week since I bought it in 1946 and this is the first time I have had to replace the elements."

The long dependable service of Harper Kilns, a result of expertly engineered design, is truly exemplified in the above kiln installation.

Photo courtesy of Lisbeth Schaeffler, New Rochelle, N. Y.

FOR DEPENDABILITY AS WELL AS ECONOMY SELECT A HARPER KILN FOR YOUR CERAMIC FIRING

They are available in a wide range of sizes to meet the requirements of schools, universities, the hobbyist, studio potter and industry. Write for literature.

Harper

HARPER ELECTRIC FURNACE CORPORATION

Dept. #3 39 River Street Buffalo 2, N. Y.

YOU WILL FIND STERLING FLASKS IN MORE THAN 4500 FOUNDRIES

The stack molding technique, illustrated here, was made possible by using Sterling flask sections to step up casting production. Ten flask sections are being poured at a time. A common sprue through the stack feeds the molten metal to runners leading to individual casting cavities.

Sterling Steel Flasks are ideal for stack molding because they are built to withstand terrific pressures. A reinforcing rib around the side prevents distortion and misalignment of the stacked molds. Top and bottom have solid sand flanges. Full width bearing.

Write for new catalog describing the complete Sterling line.

STERLING WHEELBARROW CO. Milwaukee 14, Wis., U. S. A.

PERSONAL NEWS

(Continued from page 22A)

JAMES R. NELSON, Co-ordinator of Diversified Occupations, Jackson, Mo.

DOCTOR'S DEGREE GRADUATES
University of Missouri, 1950–51

GARLAND G. HAMMER, Principal of Technical High School, Lubbock, Tex.

JOHN W. KARNES, JR., Assistant Professor of Industrial Education, School of Education, University of Connecticut, Storrs, Conn.

NORBERT KOCH, Assistant Professor of Engineering, University of Chattanooga, Chattanooga, Tenn.

RICHARD C. KOHLER, Instructor of Industrial Arts, Southern Illinois University, Carbondale, Ill.

MARION E. MADDOX, Assistant Professor of Industrial Education, College of Education, University of Arkansas, Fayetteville, Ark.

JACK W. MORGAN, Assistant Professor of Industrial Education, Kansas State Teachers College, Pittsburg, Kans.

ADVANCED DEGREES AND THESES WRITTEN

The following men were granted advanced degrees from Iowa State College, the past summer. The position, location and thesis topic follows each name.

JOHN FRANKLIN BANCROFT, Junior High industrial arts teacher, Davenport, Iowa. "Differential Characteristics of Pupils Electing Ninth Grade Industrial Arts in Davenport." TED W. CURDE, drawing instructor, Technical School, Des Moines, Iowa. "Predicting Achievement in the Trade and Industrial Orientation Course at Des Moines Technical High School." JOHN FORREST FIELDS, superintendent of schools, McCallsburg, Iowa. "Practices Related to the Individual Inventory of Iowa High Schools." RICHARD EMIL FREY, cabinetwork, Physical Plant, Iowa State College. "Reaction Time Under Conditions of Pre-Occupation With and Without a Warning Signal." LESLIE RAYMOND GRIGG, director of industrial education, Cedar Rapids, Iowa. "Forecasting High School Graduation at the Ninth Grade Level in the McKinley High School at Cedar Rapids." KENNETH WILLIAM KESSLER, industrial arts teacher, Riverside, Calif. "Forecasting Probability of College Matriculation for Graduates of Small Central Iowa High Schools." JAMES CLIFTON MANOCK, Fresno, Calif. "Implications for the Secondary School Curriculum Revealed by a Survey of Draftsmen in Industry." EARL E. MARIHART, director of industrial education, Dubuque, Iowa. "History of Adult Evening Schools at Dubuque, Iowa." EDWARD P. MORRIS, industrial arts teacher, Los Cruses, N. Mex. "Scholastic Aptitude and Grade Point Average as Factors in Stated and Present Occupational Choices." HAROLD IRVIN STADLER, armed services. "Speed and Pattern Distribution as Factors in the Perception of Relative Motion Under Conditions of Low Illumination." CHARLES THOMAS DEAN, PH.D., armed services, 9539 S. 49th Avenue, Oaklawn, Ill. "Prediction of Achievement of Native Students in Engineering at Iowa State College."

♦ DR. FRANCIS C. FRARY retired as director of research for Aluminum Company of America on January 1, 1952.

His retirement closes the active career of one of the nation's distinguished chemists and metallurgists.

Joining Alcoa in December, 1918, he organized Aluminum Research Laboratories at New Kensington, Pa.

Among the many notable achievements of this group were the development of most of the modern aluminum-base alloys, the production of very pure (99.99 per cent) aluminum by electrolytic refining, and the production of pure alumina — aluminum oxide — by electro-thermal processes.

♦ RICHARD BROLLIER, drafting teacher in the New Albany City Schools, is now the teacher of industrial arts, and principal of the Milan High School.

♦ ELWOOD SWITGER, who taught patternmaking at Muncie, Ind., is now at Hammond Tech., Hammond, Ind. His duties there, pending completion of the patternmaking shop, are the teaching of mathematics and technical information.

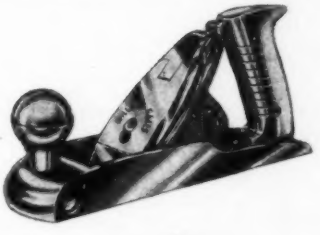
♦ FRANK SCOTT, formerly teacher of drafting in the Central High School, Fort Wayne, Ind., has been given the responsibilities of organizing and operating the co-operative education program in that school.

♦ JAMES KING, who was formerly co-ordinator at Nappanee, Ind., is now the training director for the Dow Corning Corporation, Midland, Mich. Jesse Gerber succeeded Mr. King as co-ordinator.

♦ JAMES B. CAMPBELL, dean of shopmen at Hammond Tech., Hammond, Ind., retired recently.

He came to Hammond Tech, March 28, 1927. Prior to that he was teaching in the Superior, Wis., trade school. He was brought here to start a plumbing shop which he carried on in both day and adult evening classes, and Saturday apprentice groups.

School Shop Favorites



NO. 206 BLOCK PLANE. Unbreakable, all-steel construction makes this rugged little plane ideal for school shop use. High quality tool steel cutter iron. Quick, accurate adjustment.

NO. 709 SMOOTH PLANE. A beautiful new design that is gaining popularity fast in school shops. With many unique features including unbreakable Tenite knob and handle. Also available in 14-inch length.

NO. 14 JACK PLANE. A tradition among fine planes. Unexcelled performance assured by three famous Millers Falls features: the precisely fitted cutter cap . . . the one-piece, selected tool steel cutter iron . . . the exclusive 3-point-bearing lever cap that positively prevents chatter.

Send for your free copy of Catalog No. 49

Don't place your requisition for the tools you'll need next Fall until you receive your copy of Millers Falls Catalog No. 49. 176 pages of the finest in hand tools, precision and machinists tools, metalcutting saws, and portable electric tools.

In hundreds of school shops, Millers Falls planes have earned an enviable reputation. They're clean-cutting and smooth-acting — expertly designed and sturdily built. Year after year, they'll give you the kind of performance that brings out the best work your students can do. There's a size and type that's right for every job. Look them over at your suppliers. See for yourself why they're such favorites in school shops all over the country.

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MILLERS FALLS TOOLS SINCE 1868

The Mark of Superiority

News Notes

♦ The eleventh annual Westinghouse Science Talent Search officially got under way on December 10, 1951, as 15,000 science-minded high school seniors took a three-hour science-aptitude test. Of this number, 40 will be chosen to compete in the Search finals in Washington, D. C., next February 28, and 260 more will be chosen for honorable mention.

The boy or girl adjudged the most promising young scientist in the nation will be awarded a four-year $2,800 Westinghouse Grand Science Scholarship. Runners-up will receive scholarships ranging from $100 to $2,000; the 260 honorable mentions will be recommended for scholarships to colleges and universities.

The Search is open to all seniors in secondary schools throughout the United States. For further information write to the Westinghouse Educational Foundation, 306 Fourth Ave., Pittsburgh 30, Pa.

♦ With the release of this season's first two full-length black-and-white film strips, *Looking at the Stars* and *How Heat Travels*, the Filmstrip-of-the-Month Club of Popular Science Publishing Company inaugurates its 10-month 1951–52 season. The Popular Science Filmstrip-of-the-Month Club is now in its third year. During November, members will receive the third 1951–52 film strip, Weather and Climate, now in production.

Each of the new Filmstrip-of-the-Month issues is built around a science curriculum topic, brought up-to-the-moment with current science material gathered by the editors of Popular Science Monthly. Along with each brand-new monthly film strip, Club members receive a fully illustrated Teaching Guide. Films which appeared during the past 10 months, are: Pulleys Make Work Easier, What is Horsepower, What is Soil, Gas Pressure at Work, The Eye and the Camera, How the Heart Works, Man Against Insects, How We Produced Sound and Speech, How Vitamins Help Man, and Distributing Electric Power.

For further information about the Filmstrip-of-the-Month Club, contact *Popular Science Publishing Company, 353 Fourth Avenue, New York 10, N. Y.*, or local audio-visual dealers.

♦ Since 1946, almost 700 dry-kiln operators, seasoning superintendents, engineers, and other officials from woodworking firms in the United States, Canada, and Latin America have learned what's new in kiln drying in a series of two-week demonstrations conducted by the staff of the U. S. Forest Products Laboratory, Madison, Wis.

The most recent session was given November 6–15. The next session, for which enrollments are now being accepted, will be held February 25 through March 7. In all, 76 sessions have been held since the series was begun during the twenties and resumed at the close of World War II.

Fee for the demonstration is $200 per person. This covers laboratory expenses for the actual time of the specialists who give the course, plus costs of material and the publications used as texts. It does not cover travel or living expenses.

♦ The state of Connecticut during the past year started 15 new industrial-arts shops, bringing the total number of industrial-arts teachers and supervisors in this field to 402. At present there are but 13 secondary schools in Connecticut which are not offering industrial arts at this time. Of these over half hope to have a program in by September, 1952.

♦ Reducing noises where people work was the subject of a one-day meeting October 5 at Armour Research Foundation of Illinois Institute of Technology, Chicago, Ill.

More than 200 scientists, doctors, architects, manufacturers, and civic authorities will meet at the second annual National Noise Abatement Symposium to discuss ways to control industrial noise. Speakers will also outline the effects of noise and explain methods of noise measurement.

♦ "Visual" Planning Equipment Co., Inc., Pennsylvania Avenue at River, Oakmont (Allegheny County), Pa., announces that it has a new 80-page catalogue available on request.

This catalogue contains the "why's" of three-dimensional planning, explains the functions and advantages of such planning in full detail, outlines and illustrates "Visual's" Repro-Templet System of producing reproduction prints.

In addition, it has an itemized list of over 6000 standard stock items — machine tools, material-handling equipment, shop equipment, office-planning equipment, etc.

♦ The Western Pine Association recently announced publications of a grading rules' supplement incorporating addition of a new 4/4 factory lumber grade and redefining rules for grading standard moldings.

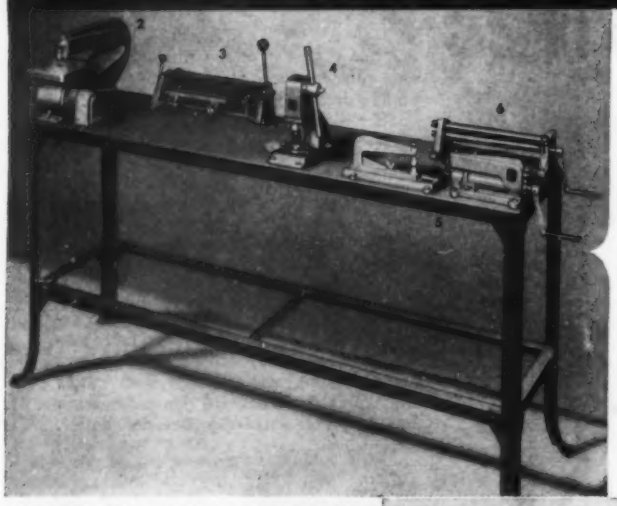
The grading rule changes were made at the association's semiannual meeting here in September. They were effective October 1.

The Association also reduced standard lengths of Larch-Douglas Fir selects to 4 ft. and longer with 3 per cent of 4- and 5-ft. lengths permitted.

Supplements, of the same size as the Associa-

(Continued on page 28A)

BERKROY SHEET METAL TOOLS



1. TOOL STAND
Heavy gauge steel. 18" x 68" x 35".

2. NIBBLER-SLITTER
12" throat capacity. Cuts odd shapes. Does straight or scroll work.

3. 12" BRAKE
Bends sheets and makes simple metal trim.

4. HAND PUNCH
For use with dies, punches and cutting blades for punching, press fits, notches, corner cuts, etc.

5. SHEAR and CLAMPING HEAD ACCESSORY
For trimming, strip cutting, outside circle and contour cutting.

6. 12" SLIP ROLL
Forms cylinders, reverse curves, scrolls, etc.

EQUIP SCHOOL SHOPS AT LOW COST FOR SOUND SHEET METAL TRAINING

SCHOOL SHOPS THROUGHOUT THE NATION are benefiting from the wide variety of interesting sheet metal projects possible with the six accurate, rugged sheet metal working tools mounted on the Berkroy steel stand. All six tools handle medium and small work up to 20 gauge. All operate exactly like larger tools used in industrial shops. For most schools, the low Berkroy price for this complete "shop-on-a-bench" permits the installation of several units and assures every student ready access to the tools he needs.

The BERKROY 24" BOX AND PAN BRAKE brings to the student a tool widely used in industrial sheet metal shops. It forms boxes from ½" to 24", 16-gauge capacity. Handles many types of intricate folds, reverse bends and radius bends. All adjustments are finger tip controlled.

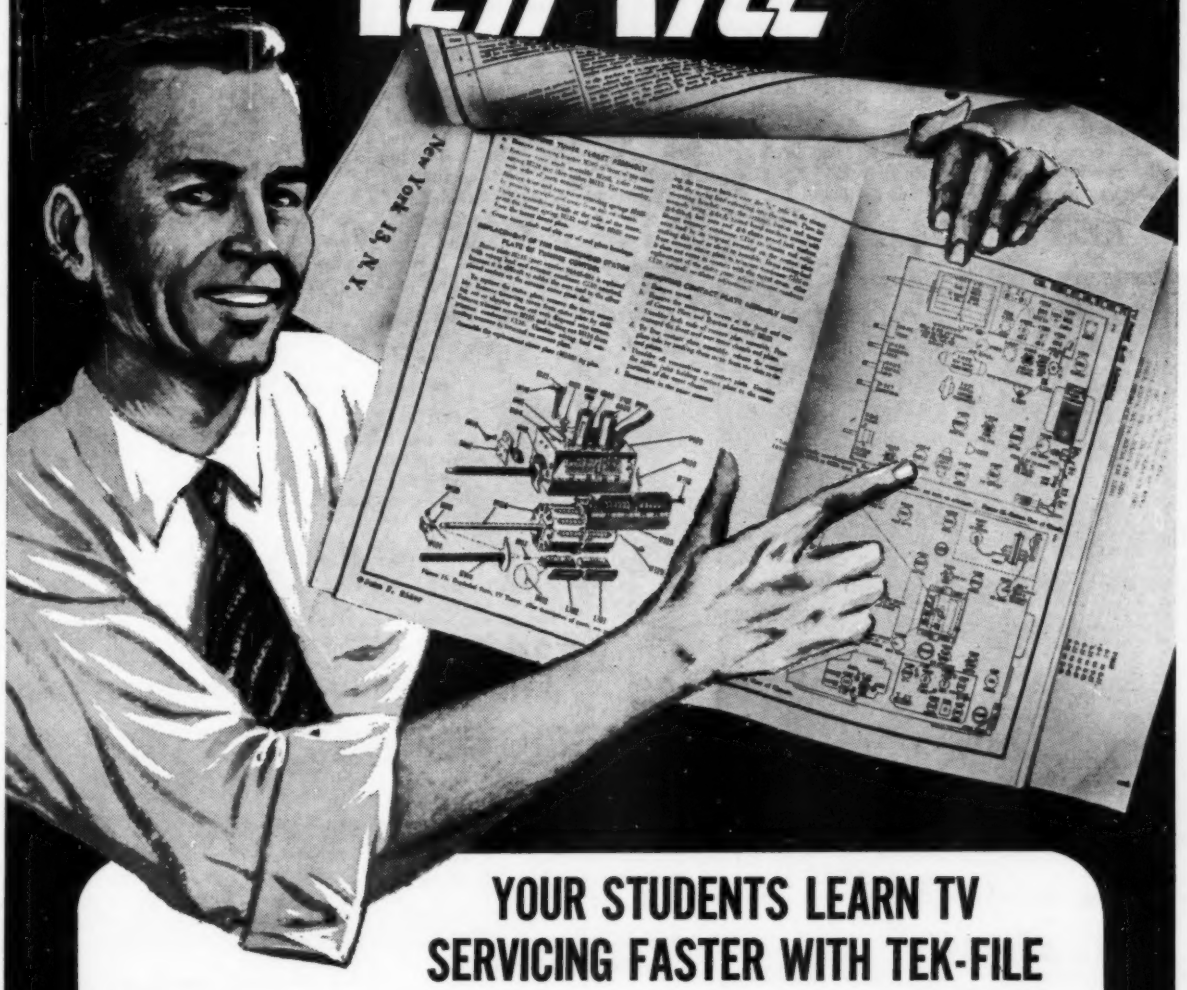
Write for Berkroy's FREE PATTERN PROJECTS specially prepared for school shop use.

For catalog information, write to

BERKROY PRODUCTS, Inc.

2512 NORTH ONTARIO ST. • BURBANK, CALIFORNIA

Tek-File



YOUR STUDENTS LEARN TV SERVICING FASTER WITH TEK-FILE

Complete service data for any set you may use for bench instruction. Rider Tek-File teaches your students to use test equipment to its best advantage for a perfect servicing job.

A partial list of contents includes all manufacturers' production runs and chassis modifications with original and modified schematics: chassis views, voltages, resistance readings, alignment procedures, trouble shooting test patterns, waveforms, parts lists, boosters, tuners and circuit action descriptions.

Each Rider Tek-File pack contains at least 128, 8½ x 11" pages bound in one or more standard file folders. All the servicing data, factory authorized, by the manufacturer whose set you designate. It's inexpensive enough for classroom use, yet so sturdy you can use it indefinitely.

Use Rider Tek-File for your bench instruction periods—it helps you teach!

The Man Who Uses Rider Tek-File-Manuals Makes More Money

FREE. ***Send a postcard for complete Tek-File data. Also new electronic books catalog.***

RIDER

JOHN F. RIDER PUBLISHER, INC.
480 Canal St., N. Y. 13, N. Y.

NEWS NOTES

(Continued from page 26A)

tion's Standard Grading Rules' book, may be secured without charge from *Western Pine Association, 510 Yeon Building, Portland 4, Ore.*

♦ Victor L. Streeter, research professor of mechanics at Illinois Institute of Technology, has been awarded a Fulbright grant for 1952.

Mr. Streeter will lecture in engineering at Canterbury College, Christchurch, New Zealand, for the academic year March to December, 1952.

♦ A student design competition, with $2,000 in prizes for the best designs for an office desk and matching chair, has been announced by The Wood Office Furniture Institute, the trade association of manufacturers of wood office furniture.

The competition, running from January 1, 1952 through midnight of April 15, 1952 is open to students of accredited schools of architecture, industrial design, art and related fields. The Institute will award a grand prize of $1,000, a $500 second prize, a $250 third prize, and five additional prizes of $50 each.

Rules, information, and an entry blank are incorporated in a booklet which may be obtained from The Wood Office Furniture Institute, 730 11th Street, N.W., Washington 1, D. C.

♦ The Norton Company, Worcester 6, Mass., is loaning without charge the following 16mm. Kodachrome sound films: Cutter Sharpening; The Cylindrical Grinder; The Surface Grinder; The Grinding Carbide Tools; The Grinding Wheel, Its Care and Use; The Diamond Wheel, Its Care and Use; Grinding Wheel Markings; and Grinding Wheel Safety.

♦ The American Standards Association, 70 East 45 St., New York 17, N. Y., just announced the publication of "Acoustical Terminology."

Consult this treatise for the latest terms and definitions used in this field. The price of this brochure is $1.50 per copy.

♦ The Interstate Training Service, 4035 N.E. Sandy Boulevard, Portland 13, Ore., has issued a small booklet entitled "How to Apply for a Job." In spite of its small size, it contains quite a little useful information for the young job hunter.

The small booklets are sold at the price of $1.50 per hundred.

♦ Faced with a shortage of engineers, the General Electric Company's Apparatus Sales Division has established a training program for non-engineering college graduates, designed to qualify them for sales assignments not requiring intensive engineering background.

The program will prepare liberal arts or business administration college graduates for a career in sales of electrical apparatus products.

The program consists of a nine-week intensified course in basic electricity, a 12-month assignment on the company's test course, and two years of specialized sales training.

A total of 29 trainees are already enrolled in the program, working presently on the test course at G-E plants throughout the country.

♦ In 1949 the nation experienced its worst polio epidemic in history. In the year 1950 there was a continued heavy polio incidence, and in 1951, as the new polio cases neared the 28,500 mark, it was realized that the annual average would be about 30,000 cases.

Because of this huge number we will have to conduct a month-long 1952 March of Dimes instead of the usual two-week drive. The drive dates are January 2–31.

♦ Plans for a county-wide survey of vocational education needs in Baltimore county's fast-developing communities were announced recently by superintendent of schools, Edward G. Stapleton, board of education, Towson 4, Md.

The survey will be conducted by the committee on vocational education of the Baltimore Association of Commerce in co-operation with the Baltimore county board of education.

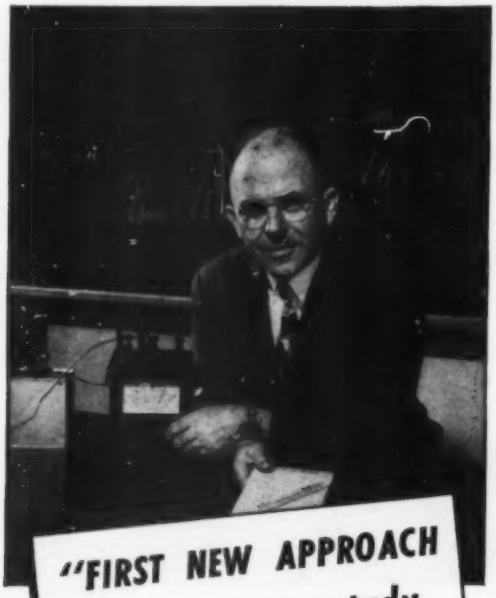
The main points to be studied are: (1) Are present school vocational programs meeting the needs of industry, business, the community, and the home? (2) How should the school-employer contact program operate? (3) Does a need exist for a vocational school?

♦ Engineering student winners of the first National Scholarship Contest sponsored by the American Society of Tool Engineers are John Wayne Boring, senior at the University of Kentucky; James Alfred Richmann, junior at the State University of Iowa; William H. Garlock, senior at the University of Kansas; and William Paul Ryan, senior at Villanova. A fifth award, to be announced later, will be made to a Canadian engineering school student.

For further information about these scholarship awards, write to Denham, 812 Book Bldg., Detroit 26, Mich.

♦ The Fred Campbell Whitcomb scholarship has been awarded for the first time to HUBERT W. CARROLL, a senior in the industrial education department. Mr. Carroll was graduated from the Morgan Township High School in 1941 and entered Miami University in June, 1949. He has demonstrated exceptional interest and ability in

(Continued on page 30A)



"FIRST NEW APPROACH to a-c current study in 50 years"

—says Professor Harold W. Bibber, head of Union College's Electrical Engineering Department

AF-2 Load Visualizer

Check these features

- Measures volts and vector amperes
- Watts, power factor, and vars can be quickly determined
- Self-contained to 50 amperes
- Extensible to 1000 amp by current transformers

G-E's AF-2 Load Visualizer provides an easier way to introduce students to current-vector analysis. You needn't interrupt your explanation of principles to make lengthy computations. The instrument and calculator get the answers quickly and simply.

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GENERAL ELECTRIC

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Hardwood Corporation of America, manufacturers of Appalachian Hardwood Lumber and Hardwood products announce the opening of an "Educational Lumber Division" to serve Industrial Arts and Vocational classes with the highest quality of thoroughly kiln-dried "Soft-Textured" Hardwood Lumber.

Personnel of the "Educational Lumber Division" have many years experience in Hardwood Lumber, Sales and Service to Educational Institutions.

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have many time-saving applications but users often find a Foredom REPAYS ITS COST on ONE JOB through eliminating on expensive disassembly and re-set job on such tasks as removing high spots on gears and touching up tools or cutters in a production set-up. The secret's in Foredom's extra small handpieces which handle like a pencil and penetrate into spots inaccessible for other tools.

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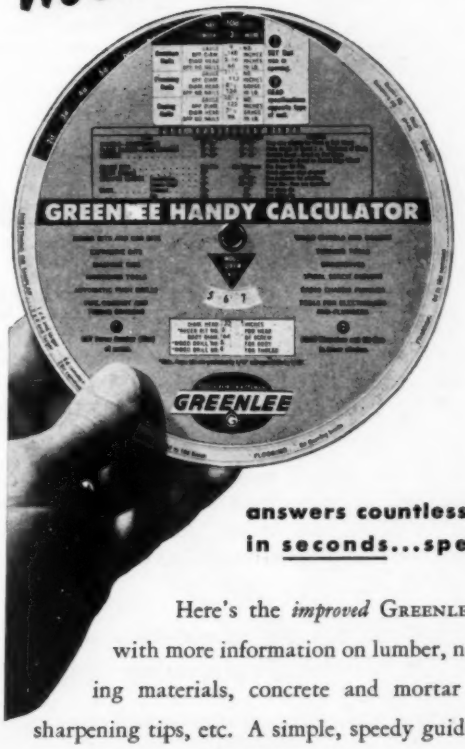
New improved woodworking calculator



answers countless questions in seconds...speeds jobs!

Here's the *improved* GREENLEE Calculator with more information on lumber, nails, painting materials, concrete and mortar mixes, tool sharpening tips, etc. A simple, speedy guide to more precise workmanship. Convenient . . . easy to read. Just set dial for nail specifications, to convert linear to board feet, find bit sizes for screws, compare characteristics of various woods. 6" diameter, heavily varnished cardboard printed in three colors.

only 25¢

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☐ Enclosed is 25c. Send your "Handy Calculator" by return mail.

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NEWS NOTES

(Continued from page 28A)

his major field, earning an average of 3.4 in industrial-arts education and a 2.8 average in all other courses.

The Fred Campbell Whitcomb Scholarship in Industrial Arts Education is a project of Miami University alumni who seek to honor their friend and teacher, Dr. Fred C. Whitcomb, in a way which he would like.

The total raised to June 30, 1951, toward the scholarship is $780.42, of which $500, on deposit in the Irreducible Department of the State of Ohio, has earned $45, the amount of the first award.

The goal set for the scholarship is $2,500, and toward that your committee intends to work with vigor in the next months with the hope of adding the name of every man who majored in industrial arts or who studied in one of Dr. Whitcomb's courses to the list of subscribers. There are 450 such men.

The committee hopes, also, that those who have contributed in the past three years will again earmark at least part of their Alumni Loyalty Fund gift this year to the Whitcomb Scholarship.

♦ How "interests" can be used to help assure success in choosing a career is the theme of a new filmstrip released by Science Research Associates, educational publishers.

Discovering Your Real Interests is the title, and it bases its explanation on the Kuder Preference Record-Vocational — a widely used and well-known psychological test by G. Frederic Kuder, professor of psychology, Duke University.

Discovering Your Real Interests filmstrip is available from *Science Research Associates, 57 West Grand Ave., Chicago 10, Ill.* Price — $3.

♦ The first state-wide industrial-arts exhibit to be held at the Louisiana State Fair is now history. The exhibit was most pleasing to the eye. Thousands of people visited the booth during the nine days of the fair.

Bossier City High School won the greatest number of prizes in the exhibit. The winners received beautiful place ribbons and valuable power and hand tools as individual awards from several hardware firms throughout the state.

Northwestern State College made a splendid contribution to the exhibit. The two scale models of industrial-arts departments and the lapidary table added the appropriate background for the exhibit. The models were fully equipped with scale model machines, benches, lumber, etc.

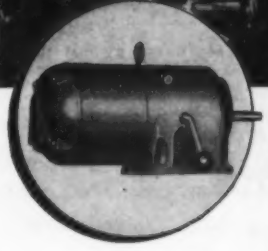
Fifty-seven per cent of last year's fatal accidents occurred during hours of darkness.

Modernized with LIMA Gearshift Drives

Specifically designed to individually motorize machine tools originally driven by lineshaft, LIMA GEARSHIFT DRIVES were selected by Ohio State University to provide its students with the very best in modern machine shop equipment.

Ohio State is but one of many schools throughout the nation that have modernized their machine shops with LIMA DRIVES, providing the utmost in functional safety, adequate lighting, proper machine location and the complete elimination of hazardous lineshafting.

Ohio State's completely modernized Industrial Engineering Department



• *Selective Speed* LIMA GEARSHIFT DRIVES for application to all types of machine tools and production equipment are built in sizes from ½ to 25 HP.

Complete engineering facilities available.

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New Publications

Making Upholstered Furniture

By Herbert Bast. Cloth, 162 pp., 7⅞ by 10¾ in., illus., $4. The Bruce Publishing Co., 400 No. Broadway, Milwaukee 1, Wis.

This book explains with words and illustrations how to make 23 different furniture frames. These frames purposely are kept as simple as possible. The finishing of the frames also is carefully described, as are also the tools and the materials used by the upholsterer.

The entire book will delight both the amateur and the experienced furniture upholsterer.

Step-by-step explanations show how each piece of furniture is made and then how it is upholstered. Each piece, also, is accompanied by a layout telling just how much material will be required for the covering.

The veriest beginner will find it comparatively easy to follow the directions in this delightful book.

Simple Bracelets

By J. W. Bollinger. Cloth, 77 pp., 6 by 9⅛ in., illus., $2.50. The Bruce Publishing Co., 400 No. Broadway, Milwaukee 1, Wis.

This book explains to the beginner just how to proceed with the job of making bracelets that will be quite acceptable even though it is his first attempt.

The book describes what metals may be used, what thickness to order, how to find the length of the blank, how to make the design and transfer it to the metal, how to cut out the blank, finish the edges, what surface ornamentation to choose and how to apply it, how to curve the bracelet, and how to apply the final finish.

The necessary tools and processes also are described.

Foundry Work

By Edwin W. Doe. Cloth, 109 pp., 6 by 9¼ in., illus., $1.76. John Wiley & Sons, Inc., New York City.

A book of related information for the foundry man, foundry apprentice, or students in the foundry and the general metal areas.

(Continued on page 32A)

They'll do a better job . . .

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"Stay Sharp" Knives

Special designs!

KEEN, hand-honed blades of the finest tempered steel . . . hardened by an exclusive process . . . hold their edge longer — cut cleanly, easily.

"Proper Grip" handles are designed especially for each cutting job. That's why more and more instructors insist on Murphy *Stay Sharp* Knives . . . . why *your* students will prefer them, too!

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144 PAGES OF BARGAINS AT NEW LOW PRICES

Filled with greatest selection of--fine domestic and imported woods...mouldings...tools...machinery...cabinet hardware...fittings--at real money-saving prices.

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FOR BETTER BORING

Stanley Bit Brace No. 923

NEW! Self-centering chuck automatically centers bit. Steel clad, ball bearing head with bronze bushings. Cocobolo handle and head. Strong, sturdy, all-steel box ratchet. Universal jaws. Takes all square taper shank bits and round shanks from ⅛" to ½". 5 sizes with 6" to 14" sweep.

Stanley "Boy Proof" Hand Drill No. 617

NEW, simplified chuck with hardened jaws and springs protected. Chuck locked on. Strong, lightweight all-steel frame. Large, comfortable handle on extra strong steel crank. Balanced speed gear assures smooth action. ¼" capacity.

Stanley "Boy Proof" Hand Drill No. 626, ⅜" capacity.

• Students learn the right way to bore holes easily, naturally, with these Stanley Tools. Their rugged design makes them practical for use in school shops. Add them to your next requisition. Stanley Tools, Educational Dept., 104 Elm St., New Britain, Connecticut.

THE TOOL BOX OF THE WORLD

STANLEY

Reg. U. S. Pat. Off.

HARDWARE • TOOLS • ELECTRIC TOOLS • STEEL STRAPPING • STEEL

NEW PUBLICATIONS

(Continued from page 30A)

It describes and illustrates information about the fundamental foundry processes, the tools used by the workers in the foundry, the various patterns that are used, the different types of molding which the foundry men make use of, cores of various kinds, the melting and pouring of metals and alloys, and finally the cleaning and finishing of castings.

The book also contains vocational guidance material pertaining to foundry work, a glossary of foundry terms, and references and visual aids.

100 Best Woodworking Projects

Cloth, 144 pp., 6⅝ by 9⅛ in., $2. Popular Mechanics Press, 200 East Ontario St., Chicago 11, Ill.

This is another volume of the Popular Mechanics Craftsman's Library. Each project is accompanied by a detailed step-by-step explanation telling the beginner just how to proceed.

The book also contains some kinks that will be found helpful in making some of the articles that are described.

Walt's Workshop

By Walt Durbahn. Paper cover, 144 pp., 5⅞ by 8 1/16 in., illus., $2.00. Hobby Books, Div. of General Publishing Co., Inc., 154 East Erie St., Chicago 11, Ill.

The author of this book is a teacher of shopwork, but he also is a great home-workshop enthusiast. His book contains 42 projects which are explained in very plain understandable language. Each of them is accompanied by a working drawing and in many instances by a halftone illustration to show how the finished project will appear.

The book contains directions for making articles for the workshop, furniture for the home, items for games and amusement, things for the house and garden, and other projects of various kinds.

He also puts on the weekly TV show by the same name, "Walt's Workshop," over Station WNBQ-NBC in Chicago.

Industrial Arts in Oklahoma

A bulletin by this name of 130 pages was published in November, 1951. It was prepared under the sponsorship of the Oklahoma Industrial-Arts Association by a committee of 18 Oklahoma industrial-arts teachers. It was planned to acquaint school teachers, administrators, and patrons with the purposes and extent of industrial arts in Oklahoma schools, and particularly to inform industrial-arts teachers about the work in which they are engaged for the purpose of increasing their pride in and understanding of their professional contribution to education.

Opening chapters show the relationship of industrial arts and general education and give the teacher specific suggestions for attaining the objectives of industrial arts. One chapter deals entirely with existing programs in Oklahoma schools, lists their industrial-arts courses, and contains many floor plans of existing shops. One extensive chapter thoroughly covers the problems of planning a school shop. There are chapters on planning a course of study, community-shop activities, the farm shop, professional organizations, teacher education, and the problem of state supervision of industrial arts.

Copies of the bulletin, "Industrial Arts in Oklahoma," may be obtained from Prof. C. L. Hill, secretary, Oklahoma Industrial Arts Association, A. & M. College, Stillwater, Okla. Price, $1.00.

Education of Visually Handicapped Children

By Romaine Mackie. Office of Education Bulletin 1951, No. 20. 46 pp. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 20 cents.

Visually handicapped children are defined in this bulletin as the blind and the partially seeing. For more than one hundred years, some attention has been given to the needs of blind children in the United States. The blind, because of the extreme nature of their handicap, were more easily identified. Not until the early part of the twentieth century was consideration given to children classified as the partially seeing, who outnumber the blind several times.

This bulletin helps to meet the need for information on the broader aspects of an all-around program for visually handicapped children in school.

Teachers everywhere who have any responsibility for blind or partially seeing children will find in this bulletin practical information to meet the problems of the day, as well as an incentive to seek further information through continued study.

Your Puppetry

By John Wright. Cloth, 132 pp., 5 by 7½ in., illus., $2.75. Chas. A. Bennett Co., Inc., Publishers, Peoria, Ill.

This very interesting book on puppet making is a far cry from some of the older books on this art, in which the marionettes were usually hideous

(Continued on page 38A)

A Complete Line of Quality Lumber from which to choose!

PAXTON

Provide for your school shop with the kind of lumber that will turn out the best projects . . . uniform, first quality materials properly graded to conform to current national grading rules. It's more economical in the long run, too, reducing waste and spoilage to a minimum. Paxton lumber and plywood are truly reliable.

Also among the items we furnish are:

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Furniture Squares — Table Legs
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BEAUTIFUL WOODS is the handbook for the woodworking industry, showing everything about lumber, its kinds and specifications. Order your copy today—only $1.00.

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Kansas City, Missouri — 1004 Baltimore

McKnight Publications —

"SILK SCREEN PRINTING"

By James Eisenberg

This instructional presentation makes use of 159 illustrations to show the details of procedure in silk screen printing. It covers five popular methods. For quick, easy understanding, reading matter is held to a minimum — students find it easy to follow the visual instruction for the various methods. Many practical suggestions for constructing silk screen equipment and tools are included. *$1.25*

"GENERAL PRINTING"

By Glen U. Cleeton and Charles W. Pitkin. A standard text for beginning students of printing. 277 photographs explain printing procedures, equipment, layout, design, history, and occupational information. *$1.80*

"GENERAL BOOKBINDING"

By Chris Groneman. Practical instruction for beginners in easy-to-understand manner. Includes plans and directions for making equipment. 64 pages. *$1.20*

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THE WOOD OFFICE FURNITURE INSTITUTE

announces a nation-wide

STUDENT DESIGN COMPETITION

$2,000 *in Cash Awards*

for the most original and practical designs for an **Office Desk and Chair**

OPEN TO:

Students enrolled in accredited schools of architecture, industrial design, art, technical studies, etc., within territorial United States.

THE PRIZES:

Grand prize ..... $1,000 (Plus expense-paid trip to San Francisco for award)
Second prize $500
Third prize $250

and 5 additional prizes of $50 each.
Total: $2,000.

THE PROBLEM:

To design a desk and matching chair, primarily of wood, for general all-around office use. Entries will be judged on the basis of originality of design, utility, and economy and feasibility of production. It is suggested that participants make a preliminary study of current office furniture designs in the showrooms of local office furniture dealers. In addition, some analysis should be made of general office desk-work and layout, as related to office furniture design.

CONTEST DATES AND AWARDS:

The competition is open from January 1, 1952, through midnight, April 15, 1952. Contest winners will be announced on May 18, 1952, at the National Office Management Convention in San Francisco. Grand Prize winner will also be given transportation and expenses to San Francisco for two days to receive award at NOMA Convention on May 18, 1952.

ENTRANCE INFORMATION AND RULES:

Contestants' drawings should be 30"x40" in size, in 2" = 1' scale. Drawings should include top plan, front and side elevations, at least one perspective, and detail drawings, where needed, to understand design, construction or use. Types of wood to be used may be listed.

Neither contestant's nor school's name should appear on drawing. Identification should be made by accompanying sealed letter. Entries should be accompanied by: 1. contestant's signed statement that his work is original; 2. statement from school instructor or dean that student is enrolled in school.

All entries become the property of the Wood Office Furniture Institute and cannot be returned.

For more detailed contest folder and entry blanks, write to address below. (Use of entry blank is optional.)

NOTE TO SCHOOL OFFICIALS:

Contest poster announcements, folders and entry blanks may be obtained by writing to the address below. Contest entries should be sent to

The Wood Office Furniture Institute
730 11th Street, N.W. • Washington 1, D.C.

The Wood Office Furniture Institute is a trade association of manufacturers of wood office furniture: desks, chairs and other equipment. Among its activities is a research program aimed at improvement of wood office furniture design. Through this competition, the Institute hopes to stimulate thinking along these lines.

You may have
PRIZEWINNING PROJECTS
in your shop right now!

INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY

Win nationwide recognition . . . plus a free trip to Detroit! Plan now to enter your students' projects in Ford Motor Company's 1952 I.A.A. program! More than 1,000 awards this year . . . with cash value totalling more than $45,000!

Size of project makes no difference. It's the quality that counts! No special projects necessary . . . you should enter the best student projects now in process.

MORE awards for teachers than ever before! Thirty instructors, whose students win Outstanding Achievement Awards, will be invited expense-free for a thrilling 3-day visit to Detroit and the famous Ford plant at River Rouge.

Build your students' interest!

Share their enthusiasm! Remember . . . I.A.A. is founded on teacher-student *teamwork!* If full information and entry blanks are not already available at your school, please write to the address below for a free booklet describing complete details.

INDUSTRIAL ARTS AWARDS
FORD MOTOR COMPANY
2926 Schaefer Road • Dearborn, Michigan

SHOP EQUIPMENT NEWS

MANUFACTURERS READY TO SUPPLY SCHOOL SHOPS

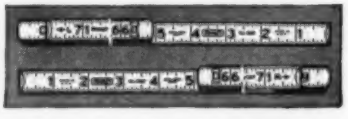
Exhibitors at the AVA Convention in Minneapolis reported no serious delays in filling orders from school shop departments for machines, tools, equipment, and supplies. There is a backlog of orders for the next six to eight months on precision measuring tools and a backlog of orders from four to six months on some heavy machine tools used in vocational schools.

Practically all of the eighty-six exhibitors of machinery, equipment, tools, books, and supplies used in industrial arts and vocational instruction reported their ability and eagerness to make deliveries for the September, 1952, school opening. Co-operation on the part of shop instructors, in placing their orders early, is necessary to avoid delays.

There were more exhibitors at the AVA Convention in Minneapolis and more industrial arts and vocational instructors registered than at any previous AVA Convention. These exhibitors placed before school shop instructors and supervisors the products which are necessary for any successful industrial education program as we know it today. On the exhibit floor of the Convention the shop instructors had the opportunity to meet the representatives of the leading manufacturers serving the school shop market, and to see and discuss the new developments in products designed for a better instructional program. These exhibits always represent a most important part of the AVA Convention. —*John F. Faber*

STANLEY'S READ-RITE RULE

Stanley Tools, New Britain, Conn., offers a new "Read-Rite" Rule with two-way reading for easier, quicker measuring. This new Stanley Zig Zag Rule, No. 156F, is designed to read left to right, or right to left, by merely rolling the rule over in a natural manner. This eliminates end-over-end twisting or flopping of the rule. When the rule is opened, graduations always lie close to the work for easy reading — from left to right or from right to left, whichever the case might be. The new "Read-Rite" is a first line Green End rule featuring longer wearing nickel silver joints with ball-socket action. The plastic finish fully protects the graduations and the large easy-to-read numbers. Branding is in red. Green Ends.



Ziz Zag, "Read-Rite" rule No. 156F

For brief reference use IAVE — 0201.

THE MILLERS FALLS 7-IN. STANDARD INDUSTRIAL SANDER

No. 870 7-inch Standard Industrial Sander

The new Millers Falls 7-in. Standard Industrial Sander is a compact and light (only 7½ lb.), new tool with power and capacity for continuous production use. It is well adapted for the new, high-performance, laminated phenolic grinding wheels and disks. The No. 870 is specially suited to the requirements of metalworking and woodworking plants and of auto body and paint shops for fast sanding, wire brushing, grinding and polishing on metal, wood, tile, plastic, glass, concrete, and other surfaces. It is sturdily built and engineered to deliver years of dependable service under tough conditions.

For further information write to *Millers Falls Co., Greenfield, Mass.*

For brief reference use IAVE — 0202.

THE ATKINS SAW EXHIBIT

M. G. Batho, La Crosse, Wis., superintendent of schools, and B. L. Owens, central district sales manager for the Indianapolis Saw Manufacturer, are shown at the E. C. Atkins saw exhibit at the American Vocational Association Convention at Minneapolis, held November 26 through December 1, 1951.

The E. C. Atkins exhibit at the A.V.A. convention

Great interest in the "Silver Steel" line of Jr. Hand, Keyhole, and Backsaws, especially designed for the industrial-arts students, was expressed by many.

In addition to these and other items, the visitors at the booth inquired about the "Shop Management Schedule Chart," shown at the left and the display of Japanese saws on the right.

BOOKS OF QUALITY
to match the SKILLED CRAFTSMAN'S other fine tools

1. **AUTOMOTIVE MAINTENANCE AND TROUBLE SHOOTING: Frazee-Bedell**
Logical trouble-shooting procedures that quickly eliminate as many units or systems as possible from consideration.
Pub. Date Feb. 1, 1952

2. **RIGHTS OF THE AMERICAN WORKER: John A. McCarthy**
Every student and trainee should be thoroughly familiar with his legal rights and benefits as an American worker.
Pub. Date Feb. 15, 1952

3. **SMALL COMMUTATOR MOTORS: Kennard Graham**
A companion book to *Small Non-Commutator Motors* published earlier this year. Covers operation, maintenance, and repair. $4.90
Published Jan. 1, 1952

4. **ELECTRIC ARC WELDING: John B. Austin**
A great advance in the preparation of "teachable" materials for instruction in modern arc welding.
Pub. Date Mar. 1, 1952

5. **METAL WORK FOR INDUSTRIAL ARTS SHOPS: Barich-Smith**
Stimulates students' interest in developing craftsmanship; develops an appreciation of good design; and outlines the occupational opportunities. $2.00
Published Jan. 1, 1952

6. **FORGING AND FORMING METALS: S. E. Rusinoff**
The author's intimate knowledge of practical industrial practices and his proven ability to transmit such information to his readers, assures that this book will readily be selected for all training programs.
Pub. Date Mar. 1, 1952

7. **RELATED MATHEMATICS FOR CARPENTERS: L. S. Chamberlain**
Reviews those arithmetic fundamentals required and directly relates them to everyday problems encountered by the carpenter.
Pub. Date Feb. 1, 1952

Gentlemen:

Please send me examination copies of the books indicated by the numbers circled below:

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WEEKLY WOODWORKING INFORMATION SHEET

DeWalt, Inc., is presently publishing an instruction aid containing woodworking information. These sheets under the name of "Saw Tips," will appear weekly. They will show new uses for your woodworking machinery, and each will present basic building and woodworking information. DeWalt, Inc., offers them free to woodworking instructors.

Once a month a chart is published. The most recent chart described the method of determining the length of rafters when the rise and run are known. Six recent issues discussed roof building, terminology, and cutting methods.

Free copies of this information sheet can be had each week by writing to *DeWalt, Inc., Lancaster, Pa.*

For brief reference use IAVE — 0203.

"GLAMORWOOD" BOX DECORATING CRAFT INTRODUCED

Metal Goods Corporation of St. Louis, Mo., has announced the establishment of a new Woodcraft Division — and the introduction of a "Glamorwood" line of wood boxes and chests for decorating and finishing.

"Glamorwood" boxes and chests are made of fine, hardwood, readily adapted to decorating by painting, wood burning, carving, metal trimming, and the application of Velvetex and wood carvings. They are available in seven basic sizes, ranging from the small 6 by 4½ by 2-in. boxes for cigarettes, cards, etc., up to the largest 12½ by 8¾ by 3¾-in. boxes for lingerie, sewing kits, hosiery, etc. These boxes are assembled and smoothly sanded, ready for decorating and finishing in unlimited ways. Each box kit contains, in addition to the beautiful blonde hardwood top and bottom, four wood feet for mounting, a two-piece catch, and two hinges and brads for assembling, and sandpaper squares of two required grits.

A "Glamorwood" painted box with metal name plate and hardware

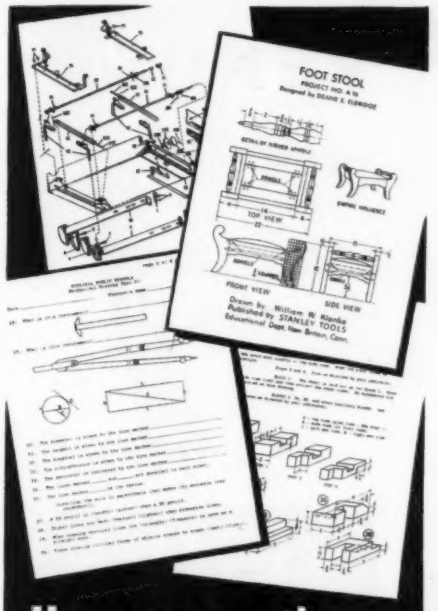
A colorful new brochure and catalog, "America's Exciting New Craft," tells all about "Glamorwood" decorating and finishing. A free copy is available from the *Woodcraft Division, Metal Goods Corp., 640 Rosedale Ave., St. Louis 12, Mo.*

For brief reference use IAVE — 0204.

SPRING-MASTER SPRING MAKING ATTACHMENT

With this simple attachment, it is possible to wind springs on a standard drill press instead of resorting to cumbersome and time-consuming lathe setups. The Spring-Master is an inexpensive spring manufacturing tool that can be applied to

(Continued on next page)



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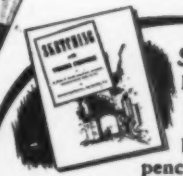

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SHOP EQUIPMENT NEWS

(Continued from previous page)

any drill press with ½-in. chuck or larger. With it springs in a wide range of wire sizes and diameters can be made at high speed.

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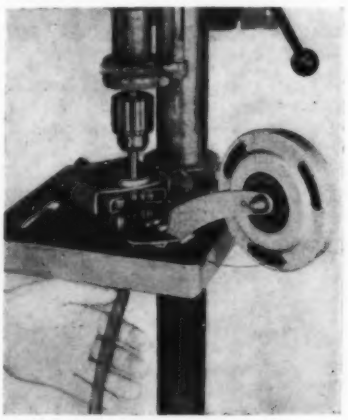

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Further details are available by writing *The DoAll Company, Des Plaines, Ill.*

For brief reference use IAVE — 0205.

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As a practical means of encouraging young men to secure training to prepare themselves for industrial careers, ten annual scholarships have been offered by Utica Drop Forge & Tool Corporation.

The scholarships, covering residence and subsistence at the State University of New York, provide for two school years of training in the university's Department of Mechanical Technology which is part of the New York State Institute of Applied Arts and Sciences. In addition, each student is expected to work in a manufacturing plant during the summer months to supplement his studies by practical on-the-job training.

In order to be eligible for the Utica scholarships, young men must have completed high

(Continued on page 37A)

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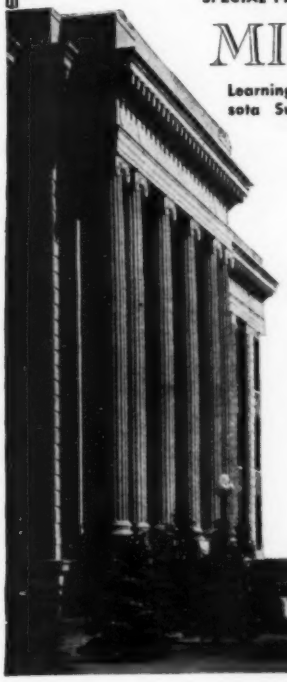

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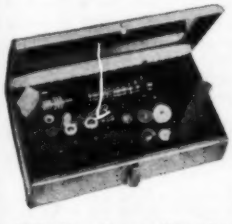

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SHOP EQUIPMENT NEWS

(Continued from page 36A)

school successfully. Selection is on a competitive basis as it is hoped the graduates will be individuals who can enter industry in jobs of considerable responsibility.

Awards of the ten scholarships to outstanding students at the university have already been made for the current school year. In addition, two similar awards have been made to employees of Utica Drop Forge & Tool Corporation. The latter will leave the corporation to take up their training at the university.

For brief reference use IAVE — 0206.

DELTA MULTIPLEX RADIAL ARM SAW CATALOG

The Delta Power Tool Division, Rockwell Manufacturing Company, has just published a 12-page catalog describing its complete line of radial arm saws for home, commercial, and industrial use.

Complete specifications of all four models are given. Special accessories for the radial arm saws, such as molding cutter head sets, drill press attachment, mortising attachment and dado head set are clearly illustrated in the catalog.

This catalog may be obtained by writing to the *Delta Power Tool Division, Rockwell Manufacturing Co., 600 East Vienna Ave., Milwaukee, Wis.*

For brief reference use IAVE — 0207.

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NEW PUBLICATIONS

(Continued from page 32A)

in their crudity. The author evidently is a craftsman who loves to have his puppets beautifully carved.

The book is specially intended for those who want to learn how to make and operate puppets in more than just an amateurish way. The directions given will help them attain both of these objectives.

A Treatise on Milling and Milling Machines

Cloth, 910 pp., 6⅜ by 9¼ in., illus. The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

This comprehensive tome is the third edition of a treatise that has grown out of the Cincinnati Milling Machine Company's 67 years of experience in building that master power machine known as the milling machine.

The clear descriptive matter and the fine illustrations cover the functions and the operation of a variety of milling machines and attachments. Much technical material also is included.

The book is both a text and a reference which will be found very helpful by the man in the shop, the teacher, and the student.

TV and Electronics as a Career

By Ira Kamen and Richard H. Dorf. Published by John F. Rider Publisher, Inc., 480 Canal St., New York 13, N. Y. Cloth, 325 pp., 136 illustrations, $4.95.

Engineering, broadcasting, manufacturing, servicing, parts and receiver distributing, sales representation, retailing, and electronics in the armed forces are discussed by the authors, and the following top authorities, who wrote on their special fields: J. R. Poppele, vice-pres., WOR-TV; R. W. Peterson, ass't. mgr., Electronics Div., Admiral Corp.; W. H. Bohlke, mgr., Custom Service Div., RCA Service Corp.

The book also contains appendices on pay scales for broadcast personnel and TV service branch personnel, electrical engineering curriculum, and educational institutes in the U. S. teaching radio, television, and electronics.

Trade, Job or Activity Analysis

By G. Harold Silvius, J. R. Slagle, and Arthur Elges. Paper cover, 69 pp., 8½ by 10⅞ in., 86 cents. Published by College of Education, Department of Industrial Education, and distributed by Wayne University Bookstore, 5000 Cass Ave., Detroit, Mich.

(Continued on page 40A)

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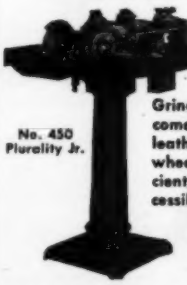

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NEW PUBLICATIONS

(Continued from page 38A)

This book will be a great help to the shop teacher in planning his work. It shows how the assignments for the course may be worked out, how operation and informational units are to be developed, how projects are to be selected, how to determine what units are to be included in the course, how to write instruction sheets, and how to apply time study techniques to teaching situations.

Offerings and Enrollments in High School Subjects, 1948–49

Chapter 5 of Biennial Survey of Education in the United States — 1948–50. Statistical aspects of study executed by Mabel C. Rice, under the general direction of Robert C. Story; text prepared by J. Dan Hull, assistant director, and Grace S. Wright. 118 pp., 30 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

This tenth survey by the Office of Education of offerings and enrollments in high school subjects will prove useful not only to students of the secondary school curriculum, but also to the segments of commerce and industry concerned with furnishing secondary schools with necessary supplies and equipment.

Rider's TV Receiving Antennas Book at Jobbers

TV and Other Receiving Antennas (*Theory and Practice*) by Arnold B. Bailey, the latest book from John F. Rider, Publisher, Inc., 480 Canal St., New York 13, N. Y., is now available at Rider distributors. It is priced at $6. It contains 606 pages, has 310 illustrations, and is thoroughly indexed.

The text, which completely discusses all types of antennas, tells what they can do, how they work, which are best, in a wholly understandable style.

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Advertisers in this index are given a code number in addition to the page number on which the advertisement appears. Refer to the advertisement for product or services available. Write direct to advertisers or use the coupon in requesting information from a number of advertisers.

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26	Atkins and Commpany, E. C.	13A
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28	Badger-American Electrotype Co.	38A
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211	Boice-Crane Company	40A
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292	Western States Envelope Co.	33A
293	Wood Office Furniture Institute	33A
294	Yates-American Machine Co.	42A

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The advertisements in this issue have been given a code number for your convenience in requesting information on products, services, booklets, and catalogs offered. Encircle the code number of the advertisement in which you are interested, clip and mail the coupon to INDUSTRIAL ARTS AND VOCATIONAL EDUCATION. Your request will receive prompt attention. BRUCE — MILWAUKEE.

INDUSTRIAL ARTS AND VOCATIONAL EDUCATION February, 1952
400 North Broadway, Milwaukee 1, Wis.

Please send information offered in the advertisements we have encircled.

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JUNIOR TYPE

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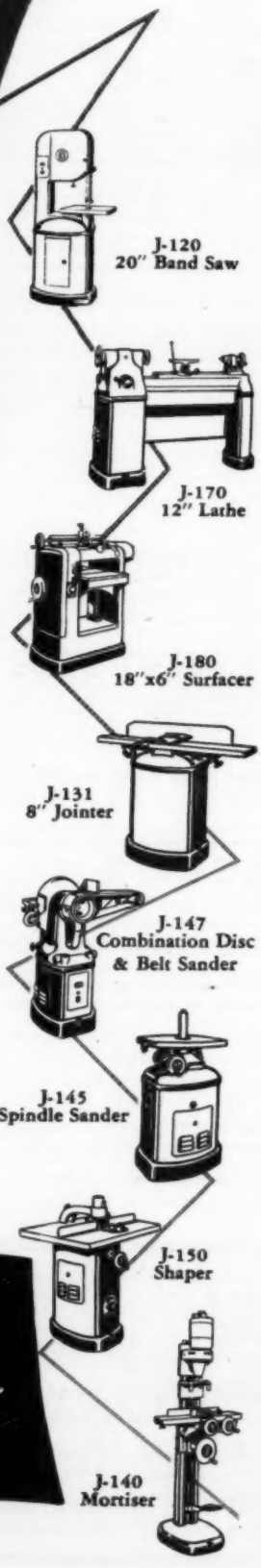
NONE but the most rugged will withstand the many years of constant usage demanded of woodworking machines in schools and light industry. That's why famous J-Line machines . . . sturdy, dependable, longer-lasting . . . are such favorites the country over. If you want the best in modern, accurate, efficient woodworking equipment . . . write for complete information on the J-Line Woodworking Machines . . . by Yates-American, leaders in the field since 1883.



YA Yates-American
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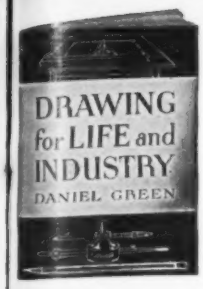

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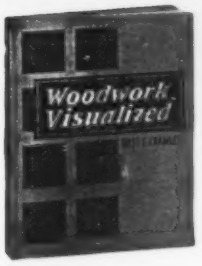

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Books I and II, Revised, Berg. A two year program; outstanding in content, emphasis, and method of presentation. Paper: Book I, 88 cents; Book II, 80 cents.
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702 Bruce Building **Milwaukee 1, Wisconsin**

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(as visualized by Tom the Trainee)

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Regal Lathes are backed by 64 years of machine tool experience, combined with the facilities of a plant turning out a complete line of 76 lathe models. Regal lathes are built in 13", 15", 17", 19", 21" and 24" sizes and in a 13" bench model. Write today for more information.

Geared headstock—Power is transmitted efficiently at eight conveniently selected speeds.

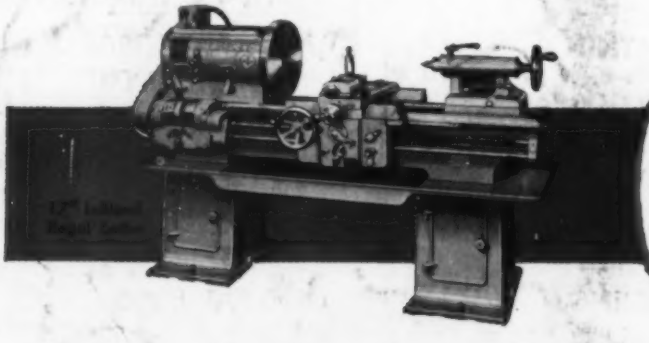
Quick-change box—56 feeds and threads can be chosen simply through this foolproof mechanism.

Leadscrew and feed rod—Both are provided to give you accurate thread-chasing, dependable feeds.

American Standard taper spindle nose—For safe, rugged, accurate positioning of chucks and faceplates.

One-piece apron—Long-life, sturdiness and protection from dirt are built into the double-wall apron.

THE R. K. LeBLOND MACHINE TOOL CO.
CINCINNATI 8, OHIO



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